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THE TREATMENT OF PROSTATIC OBSTRUCTION*

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PROSTATIC obstruction is produced by three pathologic entities, — carcinoma, contracture of the vesical neck, and benign hyperplasia, — and until nonsurgical methods are developed for either the prevention or the cure of these lesions, their treatment must remain operative. It is the purpose of this discussion to consider some of the pertinent points concerned with the selection of operation.

The choice of operation for cancer of the prostate should depend on the size and extent of the neoplasm. Most surgeons agree that radical perineal prostatectomy offers the greatest hope for cure of localized carcinomas which have not metastasized. A few outstanding specialists in perineal prostatectomy have advocated this operation for lesions showing local extension, holding the view that removal of the primary neoplastic focus provides a longer and more comfortable period of life than do less radical procedures. Personal experience and individual technical skill are important factors in evaluating the limitations of operation in this situation.

Infiltrating carcinomas of moderate size appear to do better with transurethral resection of the obstruction than with other methods of removal. Although many of these patients live for surprisingly long periods of time without developing further obstruction, many others require repeated transurethral resection. It is my belief that patients with extensive and massive carcinomas are afforded greatest comfort by suprapubic drainage.

The value of various forms of irradiation therapy in the treatment of prostatic cancer has not been clearly demonstrated. The rare circumstances in which marked regression of the tumor occurs following interstitial or external irradiation undoubtedly warrant a continued employment of these agents.

External irradiation affords marked relief of pain resulting from spinal metastases in most cases, and should be employed in preference to other palliative measures.

All urologists agree that contracture of the vesical neck or median-bar obstruction is best treated by transurethral resection. Some have gone so far as to proclaim that transurethral resection finds its ideal application in this group of cases. While it is true that occasionally one encounters a median bar that constitutes such a localized lesion that a simple transurethral excision relieves obstruction and cures the patient, too frequently the process of sclerosis has involved not only the posterior vesical lip but also the entire prostate gland and the surrounding structures, and interferes seriously with the normal functioning of the whole vesical outlet, as well as that of the prostate gland and seminal vesicles. My experience with this group of patients has demonstrated that many empty their bladders following operation but continue to have increased frequency and difficulty with voiding, with discomfort in the region of the bladder, prostate gland and seminal vesicles.

In my hands, the greatest incidence of imperfect functional results following transurethral resection occurs among this group of patients. Bearing this fact in mind, one is led to wonder if perhaps some of the surgeons who have condemned the operation have based their judgment on an experience in resection confined to this particular type of case. Other operations of greater magnitude designed to relieve the symptoms of contracture of the vesical neck produce no more favorable results than does resection, so that this procedure should remain the operation of choice for such conditions.

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Benign hypertrophy is today treated by three methods of approach: the suprapubic, the perineal and the transurethral. The evolutionary development of the two open methods of prostatectomy has been so long and gradual that the medical profession as well as the lay public have had an abundant opportunity to evaluate them. Modern transurethral resection has developed during the past decade. Its evolution during that period has been accompanied by many growing pains, and some of its critics have overlooked the fact that the evolution and perfection of suprapubic and perineal prostatectomy produced many poor results and a mortality that now seems shocking. Those urologists who have participated in the development of transurethral resection, and who now continue to select it as the method of choice where they consider it indicated, must believe that it compares favorably with other methods of prostatectomy. Their evaluation must of necessity be made from a different perspective than that of the profession at large or urologists who disapprove of the operation. The evaluation by the lay public will eventually depend on an appraisal by the patient himself, and his opinion will be based on three factors: the discomforts attendant on the immediate postoperative period, the duration of hospitalization and the functional end result. I believe that uniformly good results may be obtained if certain fundamental principles of management are adhered to.

A discussion of some of the most serious complications that have tended to discredit transurethral resection, and of certain refinements in the technic of operation which have been devised in order to avoid them, may be of some interest. These complications are, first, infection and sepsis during the immediate postoperative period; second, traumatic stricture of the pendulous portion of the urethra; and third, persisting urinary dysfunction, with cloudy, infected urine, delayed urinary sepsis and occasional recurrent hemorrhage.

Since infection plays an important part in the morbidity and mortality of operation, its control and prevention are imperative. To perform a complete transurethral prostatectomy and have the patient die of sepsis is a sad commentary on the surgeon and the operation he has performed. It is probably true that sepsis occurs more frequently as a result of the introduction of bacteria foreign to the patient than it does from organisms that the host brings with him to the operating table. The careful preparation of the patient for catheterization or instrumentation and the aseptic care of catheters and drainage systems, before and after operation, will in a large measure reduce sepsis to the status of an unusual complication. It has been my practice to employ a closed, sterile irrigator drainage system (Fig. 1) for all

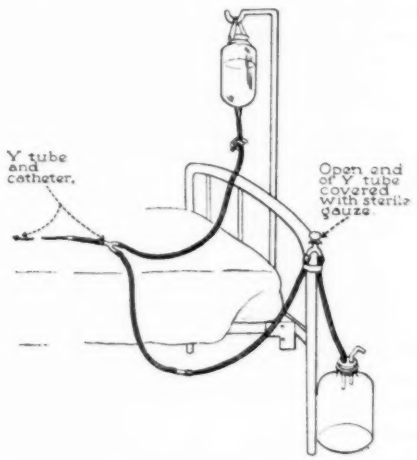

FIGURE 1. *The Irrigator Drainage System.*

One end of the Y tube between the catheter and drainage bottle is left open in order to prevent negative pressure on the bladder. This open end is covered with sterile gauze. The Y-tube level can be regulated to suit purposes of decompression.

patients requiring catheter drainage before operation, and its use is part of the postoperative routine. The entire system, wrapped in a sheet, is sterilized in the autoclave. Each ward has an available supply. Catheters are introduced with aseptic technic, and the irrigator drainage system is immediately connected. In most cases the reservoir bottle is filled with 2 per cent boric acid solution. When the bladder is grossly infected, 0.25 or 0.50 per cent acetic acid is employed. Frequent irrigations with this solution quickly clear up most severe bladder infections. The irrigator system is never disconnected when once put into use, the object being to provide drainage and to prevent the contamination of the bladder by accidental inoculation with organisms foreign to the host. The absence of sepsis which has resulted from the employment of these methods has justified a great enthusiasm for them.

The ultimate result of a perfectly performed resection has occasionally been marred by the development of urethral stricture. This unfortunate sequel has been observed by all resectionists who have checked up on their patients, but unfortunately has received practically no recognition in the literature. Bumpus[1] aptly remarks that one had better perform some other type of prostatec-

tomy than do a successful resection and leave the patient with a lesion of the urethra infinitely more debilitating and difficult to treat than his prostatism.

Resectoscopes must of necessity have sheaths of large caliber, most instruments in common use being No. 28 or 29 Fr. in size. Not all male urethras are of this caliber. It has been the practice of resectionists to dilate such urethras until they can accommodate the resectoscope. Some have even performed internal urethrotomy to attain the desired accommodation for large instruments. In either event the dilation has amounted to rupture or divulsion of the urethral mucosa, which can only result in stricture. Such an injury invariably occurs in the pendulous portion and at the penoscrotal angle, where strictures are apt to contract rapidly and are notoriously hard to dilate. The anticipated success of resection has doubtless led to occasional unwarranted disregard of the urethra and in some cases to irreparable insult. Perineal urethrotomy (Fig. 2) has been demonstrated to be a method of averting this disaster, and I have employed it in all cases in which the urethra has not easily admitted the free passage of a No. 30 Fr. steel sound. Also in rare cases in which unusual maneuverability of the instrument was desired and the prostate was excessively long, I have elected to make this approach, even though the urethra could have easily accommodated the standard resectoscope. When urethrotomy has been performed the catheter may be introduced, either through the incision or through the entire urethra, following operation, depending on the amount of pre-existing urethral disease. When the catheter is brought out through the meatus I usually take one stitch in the bulb at the site of the urethrotomy incision. A small gauze pack is then introduced into the wound and left in for twenty-four hours. If the wound is not packed in this way the skin frequently closes by first intention and a small subcutaneous abscess is apt to develop. These wounds invariably close promptly and have not in my experience been followed by any unfavorable sequelae.

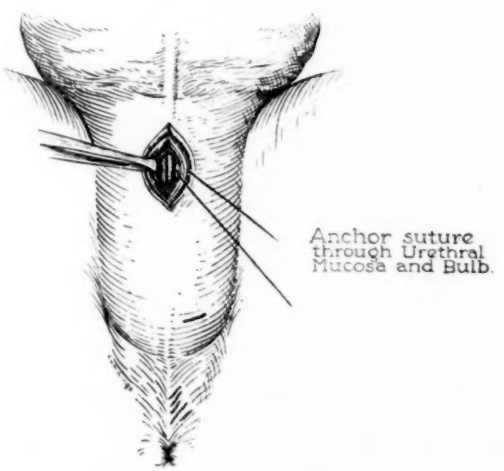

FIGURE 2. *Perineal Urethrotomy.*

Anchor sutures of catgut are introduced through entire thickness of bulb and the urethral mucosa. These aid in introducing instruments into the urethra and facilitate closure of bulb after operation.

During the early days of resection there appeared authoritative statements to the effect that the enlarged gland would shrink in size if one but removed the tissue actually giving rise to obstruction, channelizing the prostatic urethra. Experience has shown that this advice was wrong, in that a gland so resected not only fails to shrink but frequently acts as a focus for urinary sepsis. The researches of Flocks[2] have been of tremendous value, not only in providing an understanding of the pathologic anatomy of prostatism, but also in explaining the reasons for many of the postoperative complications that have tended to discredit this operation. Flocks has shown that most of the hypertrophic mass of tissue derives its blood supply from the urethral arteries, which enter the prostate in the region of the internal sphincter and course distally in the substance of the lateral lobe. In transurethral resections these vessels are cut across and thrombosed at their point of entry into the gland. If the tissue supplied by them is not removed at operation, it necessarily undergoes varying degrees of devitalization and may become infarcted throughout a considerable area. Patients harboring such septic infarcts may suffer recurrent obstruction, persisting abnormalities of urinary function, urinary sepsis and delayed hemorrhages. Their primary need for prostatectomy has not been supplied, and relief from the disability is dependent on the completion of the prostatectomy by either the transurethral route or some other. Thus the researches of Flocks, as well as clinical experience, have abundantly demonstrated that transurethral resection must be, in fact, transurethral prostatectomy. Surgeons who perform this operation must be sufficiently aware of their own technical limitations to employ it only when the gland is of such a size that a more or less complete removal of tissue can be expected.

Space does not permit a description of the technic of transurethral prostatectomy, but one feature of it, which I believe to be essential to adequate removal of tissue, will be discussed, that is, three-dimensional perception. The instruments that have been regularly used to perform this opera-

tion provide only visual perception of two dimensions. Perception of the third dimension can be obtained only through the sense of touch by rectal palpation, enabling one to estimate accurately the amount of tissue that must be excised. Pressure exerted upward or medially by the examining finger also aids materially in bringing tissue into the path of the cutting loop or blade of the instrument. Guided thus by the sense of touch, as well as by sight, one can avoid the dangers of cutting too deeply in vulnerable areas and can carry resection of tissue accurately down to the readily recognized capsule of the gland. Modifications of the resectoscope have been made available so that the operator can now work the instrument entirely with one hand, leaving the other hand free to guide safely the excision of tissue. The use of this modified instrument has permitted not only a refinement of technic from the standpoint of accuracy and safety, but also an increase in the speed of resection.

I am inclined to believe that excessively large glands are more advantageously removed by perineal prostatectomy than by multiple-stage resection. A comparison as to the mortality, comfort to the patient and length of hospitalization may well show the advantage of perineal prostatectomy in this type of case. At the present time I confine my indications for resection to benign hypertrophies of a size that will permit the completion of a subtotal prostatectomy in one operation of an hour or less. The fact that secondary resections must be performed in 6 per cent of the cases indicates that my judgment of size is not infallible. However, the secondary resections necessitated by these occasional errors in judgment are always minor affairs that take but a few minutes and do not appear to increase morbidity or materially lengthen the period of hospitalization. It is the repetition of prolonged and extensive resections that I strive to avoid wherever possible. I am performing perineal prostatectomies for glands of larger size, and expect to conduct a critical evaluation of the two procedures at a later date when a considerable series of cases has accumulated.

Very few reports have appeared which give the end results following transurethral prostatectomy. The difficulties of obtaining complete follow-up are well known, but such reports are available for an appraisal of the open methods of prostatectomy and more should be available for the transurethral procedure. A recent follow-up has been conducted to compare the end results following transurethral resection performed at the University Hospital with those following perineal prostatectomy performed by an outstanding urologist elsewhere. One hundred consecutive patients were sent questionnaires from each clinic. All these cases had been operated on from six to eighteen months previously, and all were cases of benign prostatic hypertrophy. A detailed account of this joint investigation will be reported in the near future. The comparative results cannot appropriately be presented at this time, but it can be stated that except for the factor of urinary control the results of the two procedures in these series are practically identical.

For the purpose of evaluation of the transurethral operation, certain of the data regarding our series are presented in Table 1.

In tabulating the results of operation it is of some interest to compare the statistics compiled from the recent study with a follow-up[3] carried out in 1934, when a comparison was made between transurethral and suprapubic postoperative cases operated on in the University Hospital. In that study a group of 313 cases of benign hypertrophy treated by resection were compared with 100 suprapubic cases. These three groups are compared in Table 2. In this tabulation the suprapubic operation suffers by comparison with both transurethral series. The comparison is probably an unjust one because the suprapubic cases were operated on coincidentally with the resection cases represented in the 1934 report, and were not so favorable in so far as complications of obstruction were concerned. These patients were nearly all put on suprapubic drainage because of renal insufficiency, severe infection, calculi or excessive size of the prostate.

TABLE 1. *Data on Patients Who Underwent Transurethral Resection.*

Age:	
Average	68 yr.
Youngest	48 yr.
Oldest	85 yr.
Complete retention prior to admission	55%
Preliminary preparation (over 24 hours) in hospital before operation	25%
Patients operated on without preparation by catheter drainage in hospital	75%
External urethrotomy performed on account of small urethra, severe urethritis or high-situated prostate	25%
Amount of tissue removed at operation:	
Average	39 gm.
Smallest	12 gm.
Largest	170 gm.
Number of resections employed:	
Single	94%
Two	6%
More than two	0
Postoperative days in hospital:	
Average	13 days
Shortest period	5 days
Longest period	27 days

The recent transurethral series shows to considerable advantage over the previous series in all points of comparison. It is my belief that various refinements in technic have contributed materially to these improved results, and it is my hope that further refinements in the technic of operation will be productive of even better results in the future.

TABLE 2. *Comparison of End Results.*

QUESTION	TYPE OF OPERATION: TRANSURETHRAL (1934) %	SUPRAPUBIC (1934) %	TRANSURETHRAL (1940) %
Do you void with perfect ease and comfort?			
Yes	97	90	99
No	3	10	1
Do you have perfect control?			
Yes			100
No			0
How many times do you void each day?			
2–3	16	12	35
4	29	22	39
5	17	20	9
6	13	16	12
7	25	30	5
How many times do you void each night?			
0	16	6	45
1	27	40	31
2	22	20	14
3	19	16	5
4	8	2	4
Over 4	8	16	1
Do you consider you are:			
Well?	74	74	89
Improved?	25	18	9
Unimproved?	1	8	2

SUMMARY AND CONCLUSIONS

It appears that the selection of operation for benign prostatic hypertrophy must depend on the experience and technical skill of the individual surgeon. It is probably true that in equally skillful hands the suprapubic operation carries a higher mortality than do the other methods, and that the perineal and transurethral operations have a comparable mortality.

All three operations when skillfully performed can be expected to produce excellent results, although in my hands the transurethral operation shows to advantage over suprapubic prostatectomy. Urinary incontinence and rectal injury, which occasionally complicate perineal prostatectomy even in the most skillful hands, are not to be expected in either the suprapubic or the transurethral operation.

From the standpoint of the patient, properly performed transurethral resection shows to advantage over the open methods of prostatectomy in those factors of comparison which interest him; that is, he has a more comfortable and more ambulatory postoperative period, his period of hospitalization is less, and his functional results are at least as good.

It is my opinion that the advantages of transurethral prostatectomy make it the operation of choice for benign hypertrophy, whenever it can be properly performed. I believe that the size of a benign gland does not constitute a criterion for or against resection except in relation to the skill and dexterity of the individual surgeon. The accomplished resectionist must recognize his own limitations and select the operation with a full and honest recognition of those limitations. Transurethral resection has a place in the armamentarium of every urologist; the degree of its usefulness, like that of the other methods of prostatectomy, depends on the skill and judgment with which it is employed.

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DISCUSSION

DR. FLETCHER H. COLBY, Boston: Transurethral resection has been severely and unfairly criticized, but in spite of its opponents the operation has become a recognized surgical procedure. Discussions once directed against the operation itself are now chiefly concerned with its indications. What varieties of prostatic obstruction are best relieved by transurethral resection? When the widest differences of opinion regarding the indications for this operation exist among urologists, what must be the uncertainty of the physician seeking to advise his patient?

A pertinent communication by Foley on this subject appeared recently in the *Journal of Urology* (**43**:565–571, 1940) under the unusual title, "The Present Status of Transurethral Resectionists, Competent and Otherwise." He writes:

> Statements concerning the present status of prostatic resection by urologic surgeons of truly great renown have produced perfectly fatuous and at times acrimonious differences of opinion which are meaningless. In one article is found the assertion that prostatic resection is a dangerous and worthless procedure which never should be employed beyond the original scope of Young's punch operation. It may be presumed that this author knew more about his own skill, ability and experience in resection than anyone else and that in respect to these he made a good appraisal. In another article it is said that in all cases resection is vastly superior to any form of open operation and should be employed in all cases of vesical neck obstruction. If this writer knows accurately his skill and ability and has profited by his experience, he is unique. These authors are not talking about the same thing. They are not talking about the present status of transurethral resection. There is no such thing. They are speaking of the status of resectionists and usually of their own status as such.

In other words, the indications for transurethral removal of the prostate are in direct proportion to the ability of the operator to remove it completely. Adequate removal of the hyperplastic gland is the only rational treatment of the obstructing prostate, and the occasional operator must accurately estimate his own ability to accomplish this end either by open operation or by transurethral prostatectomy. Relief of symptoms should be as permanent after transurethral resection as after open operation. Adequate and clear vision during the transurethral removal of the prostate is essential.

My own enthusiasm for this operation dates from several months spent with Kretschmer, Alcock, Thompson and Nesbit three years ago, when I learned that the enlarged prostate can be cleanly and adequately removed by transurethral resection. Although the operation has its limitations, my experience has been that resected patients are subjected to less indignity and have less discomfort, fewer complications, a lower mortality and a shorter hospital stay than is the case with those treated by open operation. Experience has taught me what glands I can best remove by transurethral resection, thus giving patients the comfort and advantages of an operation that represents one of the great advances in urology. Each operator must define his own status in this respect.

Dr. Nesbit's contributions to this operation have been considerable, and we are fortunate in hearing his excellent paper and views on a subject on which there has been so much controversy. The fact that he is here to speak to us suggests that New England has not appreciated the merits of transurethral resection to the same extent as other parts of the country.

FOOTBALL*

A Review of Injuries in Boston Secondary Schools

JOSEPH H. BURNETT, M.D.†

BOSTON

EVERY year some former football star announces that he will not let his children play football because it is overemphasized, too highly publicized or too dangerous. Since this is the case, why not take account of stock with regard to the injuries received, and try to ascertain the facts, both as to the number and variety of injuries, and particularly as to the conditions under which these were sustained? Accidents in football receive far more publicity than do those in any other sport, yet no one cares to qualify them or to make any attempt to explain under what circumstances they occurred. In 1931, after a college year noted for the number of serious accidents, a famous coach remarked: "There is no denying the fact that football is a rough game. It always will be a rough game so long as its two greatest fundamentals are tackling and blocking, wherein players must meet each other in personal collisions."

The essentials which most vitally affect the question of injuries in all branches of sport are a knowledge of how to play, and physical fitness for play. For this reason particularly, football accidents occur less frequently among professional players than they do among amateurs.

Football is played with organized teams under supervision, and with groups, large or small, without supervision. In the former group are professional, college, school and club teams such as exist in the Boston Park Department. In contrast are the games played in sand lots, parks and playgrounds without supervision, even including play in the streets. The latter present a true picture of where the real peril is to be found.

This paper will give authentic figures with regard to the number of players involved and the number and nature of their injuries, and will discuss the types of injury sustained, with particular reference to the seriousness of the situation and the problem it has become, not only to the hospitals of the country, but to the schools as well.

Dr. Augustus Thorndike, Jr., has kindly allowed the use of the statistics obtained at Harvard College, where medical conditions are ideal. There the students are thoroughly examined at the start of the year, and those who are poor physical risks are eliminated from the football squad. Throughout the season, Dr. Thorndike has control of the physical condition of the squad, being in complete charge of all injured players during the games and the sole judge of which of them are to continue in play. He examines these men on the field of play. What a contrast this is to the custom at one of Harvard's great rival colleges, where a trainer is sent on to the field, often with a stretcher, to judge an injured player's condition. This inevitably sends a chill down the spine of everyone present, and in almost every case is unnecessary.

Table 1 shows the number and types of injuries received in organized football at Harvard College in 1938-1939. In a personal communication Dr. Thorndike states that the "freedom from injury

*From the Bone and Joint Service of the Boston City Hospital.

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expectancy" increased from 33.0 days in 1935-1936 to 50.9 in 1938-1939. That is, a player reporting for organized football (varsity, junior varsity or freshman) can expect to attend 50.9 sessions of practice or games without an injury.

Another source from which figures are available is the Boston high-school system, which embraces

TABLE 1. *Football Injuries at Harvard College, 1938–1939.*

		No.
Players during season		187
Injuries	(incidence per player 0.87)	162
Serious*	(incidence per player 0.10)	18
Minor	(incidence per player 0.77)	144
Types of serious injury:		
Acromioclavicular separations		3
Concussions		3
Dislocations		4
Shoulder	1	
Knee	2	
Elbow	1	
Fractures		4
Jaw	1	
Lower leg	2	
Shoulder (clavicle)	1	
Sprains		4
Types of minor injury:		
Contusions		52
Joint	6	
Muscle	41	
Superficial	5	
Concussions		10
Infections		17
Lacerations		9
Miscellaneous		15
Myositis ossificans traumatica		2
Sprains		20
Strains		13
Dislocations (jaw)		1
Fractures		5
Hand and finger	1	
Face and jaw	4	

*Includes only those injuries which kept players from their sport for ten days or more.

fifteen teams. Here conditions are excellent. There are medical selection of players at the start of the season, proper coaching and supervision under the care of teacher-coaches, competent officials and good playing fields; allowance is made for extremes in weather, and a doctor is present at all games with absolute authority as regards the continuance of injured players in the games. Table 2 shows the number of students who took part in football and the number of injuries from 1930 to date except for 1933. Under the heading of major injuries are included all broken bones, dislocations, concussions, unless trivial, and all other serious injuries. These injuries were about equally divided between games and practice sessions.

The number and types of injuries in the 1939-1940 season are given in Table 3. From this list it readily appears that injuries of a crippling or permanently disabling nature are rare. Ankle sprains are kept at a surprisingly low figure, thanks to the adequate strapping of both ankles of every player before the games. The entry "front teeth knocked out" is of interest because of the permanent nature of the injury, and particularly because of the expense of treatment involved.

The two clavicle fractures listed were both received in the same manner, namely, by the thrust of the uplifted knee of the ball-carrier at the instant of impact. This is apparently a new way of fracturing a clavicle, in contrast to the old way of

TABLE 2. *Number of Football Players, Injuries and Major Injuries, Boston High-School System, 1930–1932 and 1934–1939.*

YEAR	NO. OF PLAYERS	TOTAL INJURIES NO.	TOTAL INJURIES INCIDENCE PER PLAYER	MAJOR INJURIES NO.	MAJOR INJURIES INCIDENCE PER PLAYER
1930	790	56	0.071	13	0.016
1931	699	61	0.087	17	0.024
1932	851	68	0.080	12	0.014
1934	772	69	0.089	17	0.022
1935	795	74	0.093	23	0.029
1936	943	75	0.080	14	0.015
1937	738	82	0.111	28	0.038
1938	739	61	0.083	22	0.029
1939	768	68	0.089	24	0.031

falling on the tip of the shoulder, or on the extended arm. In these cases there was no displacement in one and no overriding in the other.

The difference in percentages of injuries received at Harvard College and at the Boston high

TABLE 3. *Major and Minor Football Injuries, Boston High-School System, 1939–1940.*

MAJOR INJURIES TYPE	NO. OF CASES	MINOR INJURIES TYPE	NO. OF CASES
Fractures	16	Sprains	27
Nose	4	Fingers	2
Clavicle	2	Hand	1
Wrist	4	Wrist	3
Forearm	1	Elbow	1
Hand	5	Shoulder	2
Dislocations	3	Back	2
Shoulder	2	Knee	10
Elbow	1	Ankle	6
Concussions	3	Contusions	7
Synovitis of knee	1	Nose	2
Contusion of kidney	1	Chest	2
		Iliac (crest)	2
		Thigh	1
		Concussions (very slight)	2
		Lacerated wounds (sutured)	3
		Front teeth knocked out	5
Total	24	Total	44

schools is best explained by the fact that there is far more supervision at the former than at the latter, since there is more control of the players, not only during the games but during the practice sessions.

In Belmont, Massachusetts, a novel experiment was introduced by a group of former players who had sons ranging in age from eight to fourteen. Fearing the outcome of sand-lot playing without

supervision, they organized their sons, forty-six in all, into a team and supervised their play throughout the season, during which thirteen games were played. The average weight of the boys was 80 pounds. No play of any sort was allowed without some of the elders being present. Careful investigation shows that aside from a few minor contusions and an occasional traumatic epistaxis no injuries occurred. Part of this success was also due to the "quick whistle," which goes far toward preventing injuries.

From the reports given above it is only fair to conclude that the supervised game has received all the help it can expect from the rules, equipment, playing conditions, officials and the medical selection of participants. The severity of the injuries can, however, be materially controlled by the elimination of players who have been injured during a game or who have become overfatigued. It should be the duty of the doctor at the game to see to it that all such players are promptly removed. Absolute adherence to this policy will provide the best safety factor for minimizing the hazards of the future.

The number of injuries sustained in organized play contrasts sharply with the number received by boys who play on the streets, in vacant lots and backyards, in parks and so forth. These boys when injured are usually unable to receive medical care on the spot and as a result seek aid from the nearest hospital. Judging from the records of the Boston City Hospital, the conditions created by this situation have become worse each year for the last few years. Over the week ends from late September until early December it is customary to treat from twenty-five to thirty boys in the accident ward of the Boston City Hospital for football injuries alone. On Monday mornings during this period an average of thirty-five to fifty players are treated in the Out-Patient Department. Although a great many of the patients have no fracture, they have at least sufficient trauma to warrant an x-ray examination. The headmaster of a Boston high school recently stated that he is constantly having absentees on Monday morning, or receiving requests from boys for permission to go to their doctors, or more often to hospitals, to seek relief from injuries incurred over the week end, particularly on Sundays. He added that these boys play in scrub games and are not connected with any organized group.

Several years ago one of the coaches of one of the largest high schools in Boston wrote as follows:

> We had no injuries during the season except a few muscle bruises, and according to the report of our truant officer, no member of the squad was absent from school on account of any injury received from football. We did, however, have seven fractures and dislocations from boys playing sand-lot or backyard football. These boys, however, were not members of the high-school squad.

The injuries sustained by boys who came to the Boston City Hospital in the fall of 1939 for treatment are listed in Table 4. Two boys were admitted and treated for fractures of the cervical spine, but x-ray examination failed to reveal a fracture. In addition to these injuries, there were a countless number of sprains, contusions and lacerated wounds, most of which required x-ray examination for diagnosis. A great many of these cases called for hospital care.

TABLE 4. *Football Injuries Sustained by Boys Seen at the Boston City Hospital, 1939.*

TYPE		NO. OF CASES
Ruptured spleen (splenectomy)		1
Fractures		22
Clavicle	6	
Both bones of forearm	2	
Wrist	2	
Lower end of humerus	1	
Olecranon	1	
Patella (open reduction)	1	
Tibia	1	
Fibula	2	
Both bones of leg	3	
Potts	1	
Ankle (tri-malleolar)	1	
Ischium	1	
Concussion		1
Dislocated shoulder		1
Acromioclavicular separation		1
Dislocated elbow with fractured medial epicondyle (open reduction)		1
Contusion of crest of ilium (severe)		1
Synovitis of knee (crutches used)		1

From what has been said, it is evident that the worst injuries are to be found in unorganized groups. This type of play is unsafe, produces serious injuries and gives football an unjustified reputation as a dangerous game. The boys play under the most adverse conditions: without supervision, without officials, with no medical care or selection of players, and usually without protective equipment of any sort. They play on the bare ground, sometimes on pavements, and often on dusty fields, and without regard to the matter of fatigue. In the absence of officials, the boys are subjected to treatment that is against the rules, namely, clipping, piling, the illegal use of hands, holding, slugging and unnecessary roughness. Proper supervision would do away with most of these practices.

Many of the accidents mentioned occur following minor injuries, after which boys continue to play just because they can "take it." It has long been my custom to remove from the game all

boys who limp because of a knee injury, no matter how trivial. In this way the incidence of "schoolboy's knee" has been decidedly reduced. The commonest sequelae among athletes is the "trick knee"; this is usually due not to the original trauma but to a second blow received in the same game, or in a subsequent one to which the player has been admitted too soon after injury.

Much of the trouble results from adherence to the spirit of play, a practice criticized in an editorial in the January 2, 1932, issue of the *Journal of the American Medical Association,* which, in part, reads as follows:

> Even in war, humanity protests against the return of men to the front until they have recovered from their wounds. How often is a limping football player returned to the play with an encouraging and admonishing slap on the back by the coach who "needs him" in the game. In everyday life, even slight injuries are given full opportunity to be repaired. The modern football crowd shrieks for the injured players to "stick it out."

It is this sort of practice that has often caused some of the serious accidents to boys who are not physically prepared to take care of themselves. Another cause of injury is the boys' utter lack of knowledge of one of the fundamentals of football, namely, the art of blocking and tackling.

It is to this unorganized group that all those interested in physical education and athletics should turn their attention in the future. Parent-teacher associations, boys' clubs, athletic officials, Boy Scout leaders, playground supervisors, grammar and high-school teachers, coaches and, lastly but by no means least, parents, can all help in eliminating these serious conditions by a campaign of education and helpful advice. Young America will play football, with or without helpful supervision, so that it is the duty of their elders to help regulate the playing of juveniles.

Summary

Under proper supervision, with adequate equipment, with games played on good fields, with a doctor present to supervise all injured players, with properly arranged schedules, with due regard for extreme weather conditions and with competent officials in charge of games, football is certainly worth while. The results obtained in properly organized and supervised groups, as compared with those in unregulated ones, show that the incidence of football injuries can be reduced to an extremely low figure.

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TREATMENT OF SYDENHAM'S CHOREA BY FEVER AND VITAMIN B THERAPY*

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SYDENHAM'S chorea, or chorea minor, is an encephalopathy of indefinite etiology, occurring usually in young persons, most commonly between the ages of five and fifteen. It is manifested by numerous involuntary movements of the entire body, inco-ordination, diminished muscle tone and emotional and behavior disturbances of varying severity. While the exact cause of the condition is still unknown, the frequent concurrency of rheumatic fever and endocarditis with chorea, and the fact that a number of cases are preceded by scarlet fever, suggest a streptococcus as a possible causative organism. There are probably other factors in the etiology besides an infecting organism, such as dietary deficiencies, emotional strain and a basically unstable nervous system. The disease is usually self-limited, as most mild cases terminate in four to ten weeks, more severe cases may last three to six months, while some children when closely observed continue to display numerous choreiform movements for years after the acute attack. Some of these cases are diagnosed as *maladie des tics* and are considered to be of psychogenic origin. A more careful review of the past history of the patient, however, will occasionally disclose that it began as a severe chorea which somewhat improved, with some of the movements gradually acquiring the characteristics of tics. The association with emotional factors in etiology, therefore, should not in itself rule out chorea as a cause.

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Historical Aspects of Treatment

Sydenham was the first to give us a clear description of the disease and the first to outline the treatment for this condition. Its name, *chorea*

sancti viti, he borrowed from Paracelsus, the latter having applied the term to an epidemic of hysterical dancing which occurred in Germany in the fifteenth and sixteenth centuries. The conditions were entirely unrelated, but the description of the symptoms given by Sydenham in *Schedula Monitoria* (1686) and *Processus Integrii* (1693) appeared so striking, and so typical of the disease entity, that the name given to it by him, St. Vitus's dance—"He did not pique himself on being an erudite," wrote Trousseau—became accepted in medical textbooks and among the laity as a term for this disease of juveniles. Sydenham's original description also contains the earliest suggestion for treatment, namely, purging and bleeding, besides herbal polypharmacy, so much in vogue at that time. The following description is taken from the tenth London edition of *The Whole Works of that Excellent Practical Physician, Dr. Thomas Sydenham* (London: R. Wellington, 1734), containing a translation from the original Latin by John Pechey.

> Chorea Sancti Viti is a sort of Convulsion, which chiefly invades Boys and Girls, from ten Years of Age to Puberty: First, it shews itself by a certain Lameness, or rather Instability of one of the Legs, which the Patient drags after him like a Fool; afterwards it appears in the Hand of the same side; which he that is affected with the Disease, can by no means keep in the same Posture for one Moment, if it be brought to the Breast, or any other Part, but it will be distorted to another Position or Place by a certain Convulsion, let the Patient do what he can. If a Cup of Drink be put into his Hand, he represents a thousand Gestures like Jugglers, before he brings it to his Mouth; for whereas he cannot carry it to his Mouth in a right Line, his Hand being drawn hither and thither by the Convulsion, he turns it often about for some time, till at length happily reaching his Lips, he flings it suddenly into his Mouth, and drinks it greedily, as if the poor Wretch designed only to make sport. For-as-much as this Disease seem to me to proceed from some Humour rushing in upon the Nerves, which provokes such preternatural Motions, I think the curative Indications are first to be directed to the lessening of those Humours by bleeding and purging, and then to the strengthening of the *Genus Nervosum.*
>
> The more the Sick recovers, the less he drags his foot, and the hand is steddier so that he can bring the Cup more directly to his mouth; which are certain signs how much better he is; But tho to perfect the Cure I do not advise that he should be bled more than three or four times, yet purging and altering medicines are to be used till he is quite well. And because he that had once this Disease, may easily relapse; I think it is expedient that he be blooded and purged for some Days the next Year, about the same time, or a little before the Disease first invaded.

Sydenham's methods of treatment apparently did not work out satisfactorily in many cases, for the next two hundred years saw many modifications of his original treatment, with no greater success. The disease being self-limited, most of the children eventually improved, a few dying from overexhaustion. Water baths and massage were extremely popular in the early part of the nineteenth century, with the water at a temperature of 10 to 15°C. It was believed then that even if such treatment did not shorten the duration of the disease, it strengthened the patient's system so that he could go through the attack more satisfactorily. Of medical preparations, arsenic was first used by Thomas Martin,[1] of Reigate, in increasing doses, with some success, and it has remained a standard method of treatment until the present time. Shortly afterward, in 1822, Laennec[2] renewed the use of tartar emetic in large doses, completing the triad of Sydenham of puking, purging and bleeding. This was supplanted in the fifties of the last century by the employment of sulfate of strychnine, in increasingly larger doses, which also had Trousseau's[3] approval. The dose began at 1/20 gr., given three times daily, and was gradually increased until as much as 1 1/5 gr. was being administered in a day. Besides the above drugs, a motley of other preparations were recommended as useful. Corrigan[4] suggested cannabis indica; iron was widely employed because of its value in chlorosis, and because most choreic children appeared pale. Iodine in large doses, chloral hydrate, given until the patient became stupefied, and every new and modern sedative, including the barbiturates, have been given a trial in the treatment of chorea. Nirvanol was first used by Roeder[5] in 1919, with success in 2 cases. Dennett and Wetchler[6] in 1932 reported the results of its use in 72 children; in every case the movements ceased within twenty days. Weinfeld and Cohen,[7] however, treated 6 children with Nirvanol, with no improvement in any case. Monfort,[8] who treated 24 patients with this drug, found that it had been of value in that most of the cases terminated within the six-week period of treatment. The disadvantages of Nirvanol therapy are the frequency of furunculosis, the marked dyspnea and swelling of tracheobronchial lymph nodes that develop often before improvement takes place and concurrent leukopenia. The drug is toxic and beneficial only when used in doses sufficient to produce near-poisoning, and improvements are probably due to the fever which comes on together with a rash, after the drug has been administered for seven or eight days. Some deaths have also been reported. Retan[9] reports the use of perivascular (spinal) drainage in 18 cases of chorea, with marked clinical improvement in advanced cases. Because of the supposed relation of the streptococcus to chorea, sulfanilamide has recently been tried by

Massell and Jones,[10] but without satisfactory results.

Fever Therapy

From the time of Hippocrates it has been known that fever appearing during the course of certain diseases modifies the progress of the latter, quite often for the better. Hippocrates[11] observed in his book on epidemics, "The least dangerous of and the mildest and most protracted is the quartan [fever], for it is not only such in itself but it also carries off other great diseases." In one of his aphorisms he adds, "Persons attacked with quartan are not readily attacked with convulsions, or if previously attacked with convulsions they cease if quartan supervenes." It is highly probable that the convulsions that Hippocrates had in mind were the involuntary movements of chorea rather than convulsions of the "sacred disease," or epilepsy, for nowhere in his discourse on the latter does he mention the beneficial influence of fever on the attacks.

The first observations on the influence of concurrent and intercurrent febrile affections on chorea were made by See and reaffirmed by Trousseau.[3] The latter's description shows that the influence of fever on chorea was well appreciated by him and his co-workers, although he did not try to apply fever as a mode of treatment, possibly because of the lack of satisfactory means of producing it and uncertainty over the final results.

> I wish now [he writes] to call your attention to the influence which intercurrent febrile diseases possess on St. Vitus's dance, and, vice versa, the latter on the former. Dr. G. See is the one who has studied this point the most.
>
> While chorea but slightly modifies intercurrent diseases, the latter, febrile affections in particular, have unquestionably an influence on the course of nervous phenomena in general, which has been clearly indicated in the work of the ancients. "It is better," says Hippocrates, "that fever should set in subsequently to spasms than spasms after fever." In another passage he speaks in clearer terms, saying "that spasms may be arrested by acute fever," — an axiom which is fertile in applications, but which has been rejected by many, because it implies important restrictions, which have not been taken into account, and have therefore raised doubts as to the truth of the statement. For if there be instances of chorea on record which was arrested by an exanthematous fever, and afterwards recurred for a time, only disappearing at last rapidly with or without treatment, thus conclusively showing the influence of the fever on the course of the chorea, there are other cases also which clearly indicate that the axiom of Hippocrates may be completely at fault.
>
> These various diseases, which have but one symptom, fever, in common, exert a similar influence on the nervous phenomena. When these are on the point of disappearing, they are suddenly arrested by the fever, but this is exceptional only. When they are not declining, the fever first produces a general excitation, attended with the evident exasperation of the choreic movements, which latter continue as long as the premonitory and invasion stages, and the period of increase of the disease last (from twenty-four to thirty-six hours in the case of ephemeral fevers, and from two to seven days in continued fevers and in inflammations); then, as soon as the fever has reached its point of maximum intensity, the choreic jactitation begins to calm down; and from the time when the reaction ceases, although the pulse is more frequent, and the heat of the skin still greater than in health, the spasmodic movements diminish, and lastly disappear for good — yielding to the efforts of nature alone, and the more easily that the neurosis has been of longer duration.

Von Kern[12] in 1923 reported the use in cases of chorea of injections of foreign protein (sterile milk), with some success in 3 cases. The improvement was probably caused by the fever produced by the foreign protein. In 1930, Mas de Ayola[13] employed inoculation with *Treponema hispanicum* to produce fever in a case of chorea of long standing. The patient improved after four bouts of fever. Sutton[14] was the first to use typhoid vaccine injections, in 1931, to produce fever in a number of cases of chorea, with spectacular success. Her results were confirmed by Bateman,[15] Capper and Bauer[16] and others. Typhoid vaccine, however, has its limitations, as noted by Ash and Einhorn.[17] They point to the danger of reactivating a nearly quiescent rheumatic condition or carditis, and the frequent incidence of leukopenia, weight loss and exhaustion in typhoid-vaccine-treated cases.

Neymann[18] in 1935 reported the successful results of artificially produced fever by means of diathermy in 7 cases of chorea. The patients with temperatures near 104°F. received from two to ten treatments for about eight hours continuously. In a review of 69 cases treated by electrically produced fever and reported in the literature, Neymann found that 77 per cent of the patients recovered, 17 per cent improved and only 6 per cent showed no improvement. These results have been confirmed by Barnacle,[19] Osborne[20] and others. Neymann and Osborne recommend four to six treatments, with at least eight hours of fever for each, at a temperature of 104°F. or over, at weekly or bi-weekly intervals. The advantages of artificial fever therapy are that the patients can be watched more closely for changes in temperature and general condition, they are less exhausted afterward, and the temperature can be regulated much better, especially if the inductothermy short-wave method of fever induction is utilized. Its disadvantages are the need for a special apparatus to produce the fever, a trained operator to super-

vise the patient and the machine, and the need for hospitalization for two weeks to a month for the treatment.

Fever Therapy and Vitamin B Therapy

In view of the frequency of cardiac changes in chorea and the fear of untoward complications following eight hours' exposure of a child to a temperature of 104°F. or over, as recommended by Neymann and his associates, I believed that reduction in the time the patient was exposed to the high fever would be worth attempting, and to offset the reduction increased the number of treatments if necessary. At the same time the factor of vitamin B deficiency was also considered as a possible contributing cause in the development of cardiac involvement and the hyperirritability of the nervous system. The patient's diet was therefore complemented by the addition of vitamin B complex* given orally, and in some cases thiamin chloride was also given intravenously.

In the last three years I have treated 20 children suffering from chorea in various degrees of severity. Some of them were seen in a mental hygiene clinic, where they were brought because of various behavior disturbances and apparent clumsiness. A small number were referred to a crippled children's clinic when the presence of encephalitis was suspected. Seven patients exhibited all the signs of very severe chorea, as manifested in continuous movement of the face and extremities, inability to feed or dress themselves, hypotonia and muscle weakness, and inability to walk without support. The other 13 patients presented moderately severe or mild forms of the disease. In some cases they had been first referred by the school nurse or teacher because of emotional instability or clumsiness, and in a few they were said to have made faces at their teachers and fellow students. The presence of chorea was usually discovered during the physical examination. A number of patients in this group gave a history of an attack of severe chorea three months to two years previously, from which they had apparently never completely recovered.

My method of treatment for severe cases — an advanced cardiac condition was not found to be a contraindication to the treatment — consists in giving the patient six or seven fever treatments once every three or four days, and maintaining the temperature at 104°F. or over for about two hours. Every treatment is followed by the injection of 10 to 15 mg. of thiamin chloride intravenously shortly after removal from the fever cabinet, while the temperature still remains elevated. The patients also receive 4 to 8 cc. of vitamin B complex orally three times daily.

Five of the 7 very severe cases received fever therapy. In 1 the temperature was raised by means of diathermy, and the other 4 received inductothermy fever. The first patient received a total of ten hours of diathermy fever of over 102° F. in ten treatments, with complete cessation of symptoms at the end of the fever therapy. In the inductothermy-treated group, the patients received six or seven fever treatments, with two or three hours of fever of over 104°F. at each treatment, or about twenty-one hours of fever of over 102°F. I usually try to maintain the patient's temperature between 104 and 105°F. for about two hours, and he is kept about four or five hours in the fever cabinet during each treatment. The results in this group have been excellent, for the movements have disappeared entirely by the end of the treatments and there have been no recurrences so far.

In a case of extremely severe chorea, complete cessation of symptoms resulted after four intravenous injections of 10 mg. of thiamin chloride at bi-weekly intervals, and 8 cc. of vitamin B complex orally three times daily for the same period. In a less severe case of three years' duration, where the symptoms did not respond well to oral therapy, four weekly intravenous injections of 10 mg. of thiamin chloride, reduced the choreiform movements to a minimum and also brought marked amelioration in enuresis of long standing.

In the moderately severe and mild cases hospitalization was not found necessary. In a few cases discontinuation of school for a short period was advised, especially where the child's impulsiveness, irritability and sometimes mild paranoid attitude toward the teacher and other students made it worth while to keep the child temporarily away from school while he received psychiatric attention. When his condition was explained to the teacher, special arrangements were made not to overexert the patient and to discharge him from school earlier than the usual time. This group of patients received vitamin B complex orally, usually 4 to 8 cc. three times daily, in several cases supplemented by other vitamins. The improvement was less spectacular than in the fever-treated group, but the changes for the better in the behavior of the youngsters became evident in a few days after medication had been begun. Irritability was lessened, assaultiveness disappeared

*Each teaspoonful of the vitamin B complex contained the following: thiamin chloride (vitamin B_1), 1.5 mg.; riboflavin (vitamin B_2), 0.6 mg.; dermatitis factor (vitamin B_6), approximately 20 rat-day units; filtrate factors, approximately 20 rat-growth units; nicotinic acid, equivalent to 25 gm. of whole liver.

and a state of contentment replaced the previous aggression and surliness. The improvement in the psychic sphere paralleled the changes for the better in physical condition. Usually by the end of a month most of the symptoms had disappeared.

Report of Cases

The following patient was the first to receive diathermy treatment. She had a mild psychotic state associated with ideas of persecution, a threatening attitude and periods of assaultiveness. She responded well to treatment, and although she nearly recovered after the fifth treatment she was given five more in order to prevent a recurrence.

Case 1. A 13-year-old Polish-American girl was admitted to the New Hampshire State Hospital on January 24, 1937, because of marked inco-ordination of extremities, speech disturbances and period of irritability and assaultiveness. Two years previously she had swelling of the joints, associated with fever. A year later she had an attack of "acute chorea" and was confined to the county hospital for 5 weeks, when she ran away in an unimproved condition. For the last month previous to admission her movements became markedly worse. She expressed ideas of persecution and threatened her brother with a jackknife.

Physical examination showed marked inco-ordination of the hands, choreiform movements of the face and extremities, inability to keep the tongue protruded and a systolic murmur at the apex transmitted to the axilla and the entire precordium, with an apex impulse in the 6th interspace, 2.5 cm. outside the midclavicular line. The pulse was 112. The biceps, triceps, knee and ankle jerks were exaggerated.

The patient received ten diathermy treatments with a total fever of over 102°F. for 10 hours. She was given 8 gm. of Vegex three times daily and cod-liver oil. At the end of the fourth treatment her movements were greatly reduced, and they had nearly disappeared by the end of the sixth treatment. The mental symptoms and behavior difficulties also improved and she was discharged on April 10 as recovered. There has been no recurrence of symptoms.

The next patient reported was referred with a possible diagnosis of postencephalitic state. The rapid and complete recovery with fever therapy placed her definitely in the chorea group.

Case 2. A 7-year-old Albanian-American girl was first seen in March, 1939, at the Concord Mental Hygiene Clinic because of poor physical condition, continuous movement of the extremities and face, incoherent speech and inability to stand up or walk without support. She required constant attention, as she could neither feed nor dress herself. At physical examination at this time the patient was very pale, malnourished and unable to stand without support. She was in a continuous state of motion, the movements involving the face, abdomen and extremities. The pupils were dilated. There was bilateral hippus; the disks were clearly outlined and the fundal veins were congested. The patient was unable to keep the tongue protruded and co-ordination was very poor. The tonsils were enlarged and cryptic. The reflexes were markedly increased. The knee jerks were exaggerated but the other reflexes were normal.

The laboratory findings were normal except for a moderate leukocytosis and an increase in the blood sedimentation rate.

On May 23 the patient was admitted to the Elliot Hospital for fever therapy. She received six inductothermy treatments for a total of 14 hours of fever above 104°F., with a maximum temperature of 105°. She also received 10 mg. of thiamin chloride intramuscularly following the fever treatments, and 4 to 8 cc. of vitamin B complex three times daily. By the completion of the fever treatment, 3 weeks after admission, the sedimentation rate had dropped to normal. The patient gained 4 pounds, and all her choreic symptoms disappeared. She was able to feed and dress herself, and her gait appeared normal. After a tonsillectomy had been performed she was discharged 1 month after admission as recovered. There has been no recurrence of symptoms.

Case 3. An 8-year-old girl was seen first on June 13, 1939, in the Crippled Children's Clinic at the Balch Hospital in Manchester, New Hampshire, for inco-ordination, inability to stand without support or dress or feed herself, continuous movements of the face and extremities and explosive, unintelligible speech. Symptoms first appeared in April, 1939, following appendectomy, and had been getting worse.

Physical examination showed a very pale girl in continuous motion. Sides had to be placed on her bed to keep her from falling out. The disks were clearly outlined and the fundal veins were congested. There were continuous twitchings of the face, marked tremor of the eyelids, inability to keep the tongue protruded and inco-ordination of the extremities. The deep reflexes were greatly increased. There was a systolic murmur at the apex, transmitted to the axilla. The tonsils were enlarged and infected.

The laboratory findings were normal.

The patient received six fever treatments at 4- or 5-day intervals, 10 mg. of thiamin chloride following the fever treatment and 8 cc. of vitamin B complex three times daily. At the end of the third treatment her movements were greatly reduced, and they disappeared at the time of her discharge on July 21. A tonsillectomy was performed during her stay in the hospital. She received 7 hours of fever of over 104°F., with a maximum of 105°F. and 14 hours over 102°F. There has been no recurrence and she was attending school at the last report.

Case 4. A 13-year-old boy was admitted to the Elliot Hospital on July 5, 1939, with a diagnosis of Sydenham's chorea and rheumatic endocarditis. In April he had developed a sore throat, and following that pain in the joints. In June marked choreic symptoms had appeared. He had been in bed since April.

Physical examination showed a pale boy with continuous movements of the face and extremities. His speech was very indistinct. The optic disks appeared pale, especially the right. The pupils were dilated, and reacted to light and distance. There was bilateral hippus. There were continuous spasmodic movements of the facial muscles and the patient was unable to keep the tongue protruded. The hands were choreic in shape. Co-ordination was very poor. The patient was unable to feed himself or to sit up without support and required side boards on his bed. The extremities were cold and moist. The biceps, triceps, knee and ankle jerks were slightly exaggerated; no other

abnormal reflexes were found. A cardiac consultant noted an apex impulse 3 cm. outside the midclavicular line, a systolic murmur at the apex and a split second sound in the pulmonic area. The tonsils were enlarged, cryptic and full of purulent material.

The laboratory findings were normal except for an increase in the blood sedimentation rate.

The patient received 11 hours of fever of over 104°F. in six treatments, with a maximum temperature of 105°F. He was also given 10 to 15 mg. of thiamin chloride following each fever treatment and 8 cc. of vitamin B complex three times daily during his stay in the hospital. He was discharged on August 6, with the choreiform movements gone. The cardiac condition also had shown much improvement.

CASE 5. A 17-year-old French-American girl was admitted to the Elliot Hospital in September, 1939, for fever therapy, with a diagnosis of chronic chorea. Her past history was negative till the age of 7, when she had an attack of scarlet fever, accompanied by otitis media. One year later she began to show numerous choreiform movements, which subsided after a number of months. They recurred at the time of her father's death in 1937, and had been increasing in severity since then, affecting her speech, gait, face and extremities. She had received typhoid vaccine injections in 1937 without relief.

Physical examination showed a pale young woman, with numerous choreiform movements involving the face and upper and lower extremities. The speech was explosive and accompanied by numerous grunting sounds. She was unable to keep the tongue protruded. There was marked inco-ordination of the extremities and considerable hypotonia. The hands were choreic. All the reflexes were within normal limits. The diagnosis was either chronic progressive chorea or *maladie des tics*. In view of the history of chorea, the hypotonia and the inco-ordination, the diagnosis of chorea was preferred. A cardiac consultant found a systolic and presystolic murmur at the apex but no evidence of cardiac decompensation. Chronic cryptic tonsils and chronic otitis media were found by the otolaryngological consultant.

The patient received seven fever treatments, with a total of 19 hours of fever, at over 102°F. and 13 hours of fever over 104°F., with a maximum temperature of 105°F. She also received 10 to 15 mg. of thiamin chloride following each treatment and 8 cc. of vitamin B complex given orally three times daily. Following the second treatment the facial movements nearly disappeared, and the gait became normal after the fourth treatment. The ear discharge also improved. The patient was discharged from the hospital 4 weeks after admission with all the choreiform movements gone, except for an occasional rare facial tic coming on after excitement.

The following case received no fever treatment, but thiamin chloride intravenously and vitamin B complex orally.

CASE 6. R. L., a 12-year-old boy, was seen at the request of Dr. J. D. Shields, of Concord, New Hampshire, on May 27, 1939, because of numerous involuntary movements of the face and extremities and gait disturbances. He had always been emotionally unstable and given to occasional headaches. In April, 1939, he developed a temperature of 101 to 103°F. and complained of pain in the joints, migrating from the right elbow to the left leg. In May twitchings appeared in the right arm and the right side of the face. The patient became emotionally unstable and was unable to dress himself and had some difficulty in feeding.

The laboratory findings were normal.

Physical examination showed numerous choreiform movements, involving the entire body, especially the right side. The optic disks were slightly pale and the fundal vessels were tortuous. The patient was unable to keep his tongue protruded and co-ordination was very poor. The gait was bizarre, and he stumbled easily, especially with his right leg. The biceps, triceps, knee and ankle jerks were exaggerated but there were no other abnormal reflexes. The patient received four injections of 10 mg. of thiamin chloride at biweekly intervals, and 8 cc. of vitamin B complex three times daily. He began to improve immediately after the second injection, and all twitching disappeared 1 month after he had been placed on treatment.

The following case histories are representative of a group of patients seen at a mental hygiene clinic, where they were referred primarily for treatment for behavior disturbances. On physical examination the patients displayed numerous involuntary bodily movements, and in many cases a history was obtained of acute chorea one to five years previously, from which the patient had apparently never completely recovered.

CASE 7. An 8-year-old boy was seen December 8, 1938, because of inability to get along in school, restlessness and fidgetiness. Neurological examination showed a pale boy, with numerous involuntary movements of the face, shoulders, arms, hands, legs and toes. The optic disks showed some pallor on the temporal margins. The patient was unable to keep the tongue protruded; and co-ordination was very poor, all movements being clumsy and jerky. The hands were choreic in shape. The reflexes were increased but were within normal limits.

The patient was given 4 cc. of vitamin B complex three times daily. One month later the symptoms had disappeared and his behavior in school was greatly improved.

The next patient reported also was seen primarily for a behavior disturbance in school, and not for chorea. The attack was attributed to a head injury received two years earlier.

CASE 8. A 9-year-old boy was seen April 27, 1939, because of outbursts of yelling in school and inability to get along with the teacher. The mother attributed the symptoms to a blow on the head received 2 years previously; the patient was not rendered unconscious by it, and was apparently more frightened than hurt.

Neurological examination showed dilated pupils, reacting somewhat sluggishly to light. The fundi were normal. The patient was unable to keep the tongue protruded, and there were numerous involuntary movements of the face and extremities. The hands were choreic. There was marked inco-ordination of the upper extremities. The deep reflexes were sluggish. A blood Wassermann test was negative.

The patient was given 4 to 8 cc. of vitamin B complex orally three times daily. The movements had almost disappeared in 1 month. With the aid of psychotherapy the patient was making as good an adjustment in school as he had before he was hurt.

CASE 9. A 10-year-old French-American girl was seen at the Mental Hygiene Clinic of the Manchester District

Nursing Association on November 21, 1939, for numerous involuntary movements of body, dropping things, and poor schoolwork. She had always been in good health until August, 1939, when she displayed numerous abnormal movements involving the face, hands and legs. She complained of being dizzy at times, could not dress herself, dropped spoons and dishes and was unable to turn the pages of her books while at school. She improved slightly under sedatives. She was irritable at home, given to temper tantrums, appeared very clumsy in handling things and continued to be fidgety and restless.

Physical examination showed a restless patient who was unable to sit still. There was a marked flutter of the eyelids. The fundi and pupillary reactions appeared normal. The patient was unable to keep her tongue protruded. There was marked inco-ordination in the hands when trying to button clothes or turn pages. The grasp was unsteady, and the hands were athetoid. The reflexes were increased.

The patient was given 4 to 8 cc. of vitamin B complex three times daily, and within 3 weeks the co-ordination improved. She appeared much more stable emotionally and, as described by the mother, was "like her old self again."

Discussion

That streptococcal infection is not alone responsible for the symptoms of rheumatic fever and chorea has been suspected by many observers. The added factor of metabolic disturbances in the etiology of chorea and rheumatism in children, either due directly to food deficiency or to inability to metabolize certain protective substances in the diet, should be given further consideration. The kinetic disturbances and the emotional instabilities in chorea are possibly akin in origin to the kinetic and psychic states seen in alcoholic deficiency states, namely delirium tremens and Korsakoff's psychosis. While it was assumed in the past that the toxic influence of alcohol was responsible for the abnormal phenomena of the nervous system, it is now nearly certain that it is food deficiency, or the inability of the alcoholic patient's stomach to absorb vitamin B components from the diet, that accounts for such changes. This premise prompted the use of vitamin B complex as a complement to the diet in the treatment of chorea.

The action of fever on chorea is probably nonspecific, and is similar to its action on arthritis, asthma and other conditions. It produces general capillary dilatation, reduces vasospasm in the joints and small cerebral blood vessels, improves the flow of blood, increases the number of circulating red blood corpuscles in the blood stream, greatly improves oxygenation and accelerates the supply of oxygen to all parts of the brain, besides probably also assisting in mobilization of all the defense mechanisms of the body. Artificial fever, however, if continued too long defeats its own purpose, for it then produces vasomotor paralysis and cyanosis rather than increased oxygenation. It is this that prompted me to reduce the number of hours of fever given to patients, with equally successful results. None of the patients had any untoward reactions during the fever treatments or following the intravenous medication. The administration of thiamin chloride during the stage of capillary dilatation and improved circulation helped to produce better diffusion of the medication throughout the central nervous system. The patients required no other medication during their stay in the hospital or at home.

Osler[21] in his excellent monograph on chorea states, "Psychical disturbance is rarely absent in chorea; fortunately in the majority of the cases it is slight in degree." He lists the following outstanding symptoms: disturbance of the moral sense, perverseness, great irritability of temper, with emotional outbreaks and change in character; disturbances in the faculties of memory and attention; transient loss of power to read and write; and impulsive actions. It is probable that some of the behavior disturbances occurring in children at an older age are sequelae to an attack of chorea which was either so mild in its physical characteristics as not to attract attention, or was not brought out in the past history. Shaskan,[22] in a recent study of a number of choreic children with behavior disturbances at Bellevue Hospital, New York City, concluded after interviewing many of the parents that personality factors are not the cause of the affection, as believed by some observers, and that in most cases no significant disclosures concerning behavior, personality of the children and family history were obtained which would support such an assumption. The improvement in behavior after treatment he believed to be of additional significance. The changes for the better in the personalities and general behavior of the children with chorea whom we treated tend to support Shaskan's viewpoint. The changes were observed both by the parents and the teachers. The behavior changed for the better, although the home and school environment remained unaltered.

Summary and Conclusions

Twenty patients with severe, moderately severe and mild cases of Sydenham's chorea were treated. Five of the 7 severe cases received artificial fever therapy, together with vitamin B complex given orally and thiamin chloride given parenterally. One severe and 1 moderately severe case received thiamin chloride parenterally and vitamin B complex orally, while all the others received oral medication only.

In the electropyrexia-treated cases recovery was

produced with about fourteen hours of fever at 104°F. or over. When this was combined with vitamin B therapy, advanced cardiac conditions were found to be no contraindication to the fever treatment. Usually a change for the better in the carditis was noted at the end of the treatment.

One of the 2 cases treated with thiamin chloride responded with cessation of symptoms after the second intravenous injection of 10 mg. of the drug.

Various degrees of behavior disturbances were seen in most of the moderately severe and milder cases. They all received 4 to 8 cc. of vitamin B complex orally, three times daily. The improvement in physical manifestations was less rapid than it was in the fever-treated cases, but most of the symptoms disappeared within one month. No hospitalization was required for any patients in this group. Improvement was noted in their behavior concomitantly with the change for the better in the choreic manifestations.

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NEW HAMPSHIRE MEDICAL SOCIETY

PROCEEDINGS OF THE ONE HUNDRED AND FORTY-NINTH ANNIVERSARY

MAY 14 AND 15, 1940

TUESDAY MORNING, MAY 14

THE members convened in the Hotel Carpenter, Manchester, at nine-thirty o'clock.

The first part of the morning was devoted to the following round-table conferences:

MEDICINE. Bronchial Asthma. — Leader, Philip B. Daniels, Keene.

SURGERY. Surgical Diseases of the Gall Bladder. — Leader, Herbert B. Messinger, Franklin.

NOSE AND THROAT. Common Diseases of the Ear, Nose and Throat. — Leader, Henry H. Amsden, Concord.

OBSTETRICS. Postpartum Hemorrhage. — Leader, Marion Fairfield, Nashua.

During the second half of the morning the following round-table conferences were held:

MEDICINE. Endocrinology. — Leader, J. Dunbar Shields, Concord.

SURGERY. The Management of Head Injuries. — Leaders, M. Dawson Tyson and John B. McKenna, Hanover.

UROLOGY. Injuries to the Kidney. — Leader, Isadore J. Zimmerman, Manchester.

ORTHOPEDICS. Fractures. — Leader, Harris E. Powers, Manchester.

TUESDAY AFTERNOON, MAY 14

The session convened at two o'clock with President Woodman presiding.

The early part of the session was devoted to a symposium on diabetes with the following titles and speakers: "Diet and Insulin," Dr. Alexander Marble, Boston; "Diabetes in Children and Adolescents: Problems and management. Pregnancy in the Diabetic," Priscilla White, Boston; "Diabetic Hazards and How to Meet Them," Dr. Elliott P. Joslin, Boston.

The symposium was followed by an address, "The Medical and Surgical Management of Ulcerative Colitis," by Dr. More Mills, of New York City.

WEDNESDAY MORNING, MAY 15

The first period beginning at nine-thirty o'clock was devoted to the following round-table conferences:

MEDICINE. Hypertension. — Leader, Jeremiah J. Morin, Rochester.

SURGERY. The Treatment of Burns. — Leader, Radford C. Tanzer, Hanover.

PEDIATRICS. Infant Feeding. — Leader, Thomas B. Walker, Portsmouth.

SKIN. Certain Problems in Syphilis. — Leader, Henry W. N. Bennett, Manchester.

The general session convened at eleven o'clock.

PRESIDENT WOODMAN: My first duty on this morning's program is always a pleasant one, namely, to introduce the delegates from the Societies of the New England States.

I shall first call on Dr. William T. Rowe, of Rumford, Maine.

DR. ROWE: The Maine Medical Association extends its best wishes to the members of the New Hampshire Medical Society.

I extend an invitation to the members to attend our meeting, which takes place at Rangeley Lakes, June 23, 24 and 25. If you do not like medical papers, we shall have good fishing and golf for you. We want to see as many of you up there as can come.

PRESIDENT WOODMAN: If Dr. Albert M. Cram of Vermont is here, we should like to have a few words from him. [Dr. Cram was not present in the auditorium.]

We shall now hear a few words from Dr. Charles S. Benson of Haverhill, Massachusetts.

DR. BENSON: I am very glad to come up here and give you greetings from the Massachusetts Medical Society. I am no stranger. For at least a decade I have been attending your meetings.

The Massachusetts Medical Society has its meeting next week in Boston. Our society extends its best wishes and an invitation to all who desire and would like to visit the meetings, which will be held at the Copley Plaza on Tuesday and Wednesday.

PRESIDENT WOODMAN: Another delegate from Massachusetts is Dr. Edward A. Adams, of Fitchburg.

DR. ADAMS: I second the invitation which Dr. Benson has given, and I also wish to say that I have had a very fine time here. Your medical meetings are most valuable, and I have heard some excellent papers. The round-table conferences on burns and head injuries were very fine. But the nicest thing of all is meeting new friends and seeing old friends whom I met last year.

PRESIDENT WOODMAN: I now call on our old friend, Dr. Karl T. Phillips, of Putnam, Connecticut.

DR. PHILLIPS: The Connecticut State Medical Society sends its best wishes to your society. I am sorry that our meeting comes at the time of the meeting in Massachusetts, but you have your choice. The Connecticut meeting will be held next Wednesday and Thursday, at the Hotel Bond. We also have tentative plans for an excellent meeting in the fall, the Clinical Congress.

I must admit that I have had a better time up here than I usually do at the Connecticut meetings, and I guess that speaks for itself.

PRESIDENT WOODMAN: I now have the very great pleasure of introducing a man who is at the top. When you consider the comparative efforts, strength and virtue of the American Medical Association, as compared with any other medical society in the world, you will realize that Dr. Van Etten is actually "tops."

It gives me great pleasure to introduce to you Dr. Nathan B. Van Etten, president-elect of the American Medical Association.

There followed an address, "Education of the Intern," by Dr. Nathan B. Van Etten, president-elect of the American Medical Association, and Dr. Nathan Smith, of New York City.

WEDNESDAY AFTERNOON, MAY 15

The session convened at two o'clock, with Vice-President Ezra A. Jones presiding.

CHAIRMAN JONES: First, on this afternoon's program, is the presentation of the medals to those who have been members of the Society for fifty years.

Dr. Woodman had planned to say what is written here. After looking it over, I decided I could not say anything half so well, so I am going to read what he has written.

> It is now my duty and very great pleasure to recognize on behalf of the New Hampshire Medical Society these distinguished men who are members of the Society.
>
> These men have served their fellow-men as physicians and they have been members of the Society for fifty years. They have been integral parts of much that has been accomplished in medicine during the past half century. They have risen to their daily tasks each day and discharged them faithfully and well. Through fair weather and bad weather, through good times and bad times, through the vicissitudes of life, they have carried on.
>
> Therefore, it is fitting that at this great milestone the Society should honor them by the presentation of these tokens of our esteem.
>
> In accepting these beautiful medals, may you enjoy not only their beauty of design and fine materials, but also the esteem, appreciation and honor which it is our privilege to bestow.

May we offer you our heartfelt congratulations and our undying good wishes.

Dr. Frank E. Kittredge, of Nashua, it gives me great pleasure to pin this medal on you.

DR. KITTREDGE: I have not very much to say, except to express my appreciation for the honor of having this medal pinned on me. It is the only thing that I ever had pinned on me just because I have lived; I do not know of any real work that I have done to earn the medal.

Dr. Abbott, of Laconia, wanted to know why I was having a medal pinned upon me today; he said he gave me a medal two or three years ago, when he was president. Another man told me I must be coming up for another fifty years, because he knew of one pinned on me fifty years ago.

So you see, I am quite old. Well, fifty years is a long time, looking back, and it is a long time looking ahead. But many of us do not look ahead fifty years.

I just want to say that I believe I have practiced medicine during the best period of medicine. I have practiced medicine when we were practicing the art of medicine, and I am now practicing medicine through what we call the scientific period of medicine, although I am afraid I know but very little of the scientific part of it.

There is one thing that gives me a great deal of satisfaction, though, in watching my fellowmen who were graduated within the last fifteen or twenty years, under scientific medicine. I have noticed that they have acquired the art of practicing medicine. I do not believe that anyone can practice just laboratory medicine, the science of medicine, without acquiring somewhat the art of practicing medicine, in order to fulfill his mission in life.

I thank you.

CHAIRMAN JONES: The next recipient of the fifty-year medal is Dr. George H. Gray of Hyannis, Massachusetts. Dr. Gray has not been in New Hampshire for some time, but we are glad to have him keep up the membership here.

DR. GRAY: I cannot tell you how much pleasure it is for me to come back to the state where I started to practice medicine fifty-one years ago. Of course, at that time, like everybody else, I knew very little about what was ahead of us, and, having a little ambition to better myself, after two years in New Hampshire, I moved to Massachusetts.

Well, the Lord has been good to me during all these years, and I have perhaps succeeded better than I could ever have hoped to do at that time.

I expect that I shall be back in New Hampshire before many years, and that what there is left of me will stay here. For that privilege, I shall also be very grateful.

I am very grateful to all of you for the very great honor that I have received.

Thank you very much.

CHAIRMAN JONES: Dr. Arthur K. Day, of Concord, you are also to receive a fifty-year medal.

DR. DAY: First, may I present my heartfelt thanks for the gift of this medal, which represents to me the fifty years of practice of medicine in Concord.

Another thing that I am very grateful for is having been a member of this society. I want to say a word about that membership. You can never appreciate what a pleasure it has been to me in the last fifty years to enjoy the cordiality of the medical profession in New Hampshire. If I were out of town and did not know what to do, — if I got lost in the woods, so to speak, — all that it was necessary for me to do was to find the country doctor or the city doctor, who could tell me just what I wanted to know. Now, that, really, is a privilege, and I want to thank all of you for just that.

I have a short story to tell you; it is about something that happened when I was around forty years of age. I was at one of our meetings, and was greeted by one of the older doctors. We were conversing, when he said to me, "Doctor, how old are you?" I told him my age, and he replied, "Do you know that you will be eighty before you know it?" I have kept that remark in my mind ever since, and I assure you that the eighty mark is mighty near. I think I am the oldest of the three receivers of medals today.

I have enjoyed my day here, and I know that all our members are cordial and kind to every other doctor in the State.

Thank you very much.

CHAIRMAN JONES: Next, we are going to hear the report of the Trustees, by Dr. Henry O. Smith.

FINANCIAL REPORT OF TRUSTEES OF THE NEW HAMPSHIRE MEDICAL SOCIETY FOR THE YEAR ENDING MAY 1, 1940

Receipts

Interest on various bank deposits	$466.98
Final liquidating dividend of Merrimack River Savings Bank	128.38
From the Secretary, "to be added to the General Fund"	1000.00
Increase in funds other than Benevolence Fund	$1595.36

GENERAL FUND

Deposit: New Hampshire Savings Bank	$5770.34
Portsmouth Trust and Guarantee Company	3402.38
Nashua Trust Company	$2632.96
Total funds available for general use on May 1, 1940	$11,805.68

BARTLETT FUND

Deposit: Portsmouth Savings Bank ($352.11 of this is a permanent fund, the income to be expended only "for the benefit of medical science, as may be directed by vote of this society")	$6394.19

PRAY FUND

Deposit: Strafford Savings Bank ($1000 of this is a permanent fund, the income to be expended only for prize essays)	$1417.66

BURNHAM FUND

Deposit: New Hampshire Savings Bank ($1140 of this is a permanent fund, the income to be expended only for prize essays)	$2137.57

BENEVOLENCE FUND

Deposit: New Hampshire Savings Bank ($229.87 of this is accrued income, available for the purposes of the fund)	$2677.20

Two prize-essay awards, in equal amounts, have been made, one to the author of a paper, "Postmortem Examinations in Rural Practice," and the other to the author of a paper, "A Study of the Slipping Rib-Cartilage Syndrome." It is expected that prizes will be offered in 1940–1941, and notice will be sent to the members of the Society in due time.

The following recommendation to the Society has been made by the Trustees: "The Board of Trustees recommends to the House of Delegates that the sum of $2000 be given to the Trustees of Dartmouth College to be used in helping defray the costs of sorely needed equipment for the medical school, this amount to be taken from the accumulated income of the Bartlett Fund, which can be used only 'for the benefit of medical science.'"

The accounts of the Treasurer have been examined and found correctly cast and properly vouched.

HENRY O. SMITH,
SAMUEL T. LADD,
FREDERIC P. LORD.

The program for the latter part of the afternoon was as follows: "Vitamins," Dr. Cornelius P. Rhoads, New York City; "Diverticulitis," Dr. John F. Erdmann, New York City.

WEDNESDAY EVENING, MAY 15

The banquet was held at the Hotel Carpenter at six-thirty o'clock with Dr. John F. Gile, of Hanover, as anniversary chairman. The speakers were as follows: Dr. James B. Woodman, president; Ross McKinney; and Dr. Nathan B. Van Etten, president-elect of the American Medical Association. The in-coming president, Dr. Ezra A. Jones, of Manchester, was introduced.

REPORT ON MEDICAL PROGRESS

TREATMENT OF PNEUMONIA*

MAXWELL FINLAND, M.D.†

BOSTON

IN LAST year's report, Lord[1] reviewed the essential features of chemotherapy as applied to patients with pneumonia, and presented the clinical evidence then available for the efficacy of sulfapyridine in the treatment of this disease. Among the 1612 sulfapyridine-treated cases of pneumonia that he collected from the literature the mortality was 6.3 per cent, as compared with an expected mortality in similar untreated cases estimated at 25 per cent. Such comparisons as were available indicated a superiority of sulfapyridine over specific serums with respect to the mortalities attainable in the treatment of pneumococcal pneumonias. While theoretical and experimental evidence indicated that the combination of these two remedies offered the optimum therapy, the clinical results with the combined treatment were not conclusive.

Numerous additional clinical reports on the serotherapy and chemotherapy of pneumonia in scattered localities throughout the world have appeared since Lord's review. The combined mortality figures collected from a number of these reports‡ are of some interest. They may be divided into four groups.

One group of reports dealing with the use of sul-

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‡The papers that are summarized constitute only a part of the vast number which were not included in Lord's report. They were chosen only because readily available.

fapyridine alone in the pneumonias of adults[2–24] includes 2052 cases with 162 deaths, a mortality of 7.9 per cent.

A second group comprises the reports of authors who used both serum and sulfapyridine in adults.[25–42] It includes 2224 cases treated with specific serums alone, with 301 deaths (13.5 per cent); 2638 cases treated with sulfapyridine alone with 256 deaths (9.7 per cent); and 557 cases treated with the combination of serum and sulfapyridine, with 95 deaths (17.1 per cent). The combined therapy was reserved mostly for the severest cases or for those in which the drug did not bring about a satisfactory result.

A third group of reports by other authors, dealing solely with the use of specific serums[43–53] just prior to or during the first few months after the introduction of sulfapyridine, includes 2727 cases with 263 deaths (9.6 per cent). The latter results reflect the remarkable improvements in serotherapy brought about by the introduction of therapeutic rabbit serums. Nevertheless, they still represent a more limited group of cases of pneumonia, and in that respect the results are not strictly comparable with those obtained with chemicals.

The fourth group of reports deals with the treatment of pneumonia in infants and children. This includes 1542 cases treated with sulfapyridine alone[24, 25, 31, 35, 54–73] with 46 deaths (3.0 per cent), and a more limited group of 312 cases[35, 68, 74–76] treated with serum among which there were 11 deaths (3.5 per cent). Of interest is the fact that a large proportion of the latter cases were given serum intramuscularly. Among the sulfapyridine-treated cases there were 70 in which the pneumonia complicated pertussis, and 12 (17 per cent) of these patients died.

Essentially, these results substantiate the conclusion drawn from the earlier reports. All authors emphasize the dramatic clinical response so regularly observed in uncomplicated cases, particularly in young adults. Pediatricians are particularly enthusiastic because of the ease of administration of the drugs, as compared with the difficulties encountered when serums are used. The deaths that are still encountered occur mainly in very old persons, in patients with complicating severe systemic disease and in those in whom treatment is delayed until the patient is already moribund, or until focal infections have already become established. The discrepancies in the mortality among the individual reports are attributable in large measure to the differences in the frequency with which these factors are encountered.

Another source of discrepancy depends on the diagnostic criteria used by various authors. Lobar and bronchopneumonias, primary and secondary pneumonias are considered together by some and separately by others. Most authors have tried to limit their reports to cases in which pneumococci were identified in sputum or other body fluids. Of course, the relation of the pneumococci to the disease is not always clear, particularly when "higher" types are identified solely from sputum or throat cultures.

It is not possible to determine from the available data the true value of the drugs in non-pneumococcal pneumonias, owing in large part to the difficulties in arriving at an etiologic diagnosis. The application of the Neufeld method of typing directly from sputum has given most laboratory workers a feeling of unjustified sufficiency. Reports of "no pneumococci" or "pneumococci, no type" are only too frequently based on cursory inspection of wet preparations of sputum with diagnostic rabbit serum. Attempts are rarely made to classify the predominant pathogenic organisms by morphological and cultural methods.

The most striking and most constant beneficial effects from sulfapyridine have occurred in the cases of primary pneumococcal pneumonia. So far as can be determined from available reports, the results in cases of bronchopneumonia and in secondary pneumonias have also been good, but usually not so striking. The effects in pneumonias due to hemolytic streptococci are usually favorable, but not so dramatic as in those due to pneumococci. Only occasional favorable results are noted in staphylococcal pneumonias, while the results in cases of Friedländer's bacillus pneumonia have been, on the whole, discouraging.

No important new facts have been brought out concerning the toxicity of sulfapyridine. Most writers stress the relative ease of administration, especially in children, and the rarity with which serious complications of treatment are encountered if the usual simple precautions are followed. The importance of ensuring adequate fluid intake and output to prevent the significant renal complications is stressed. Since prolonged therapy is not necessary except where focal complications are being treated, serious granulocytopenias are not frequent. When therapy is continued for more than one week, frequent white-blood-cell counts and blood smears should be made, and the drug stopped as soon as leukopenia with reduction of polymorphonuclear cells is detected. It is also becoming evident that the conditions under which the drug is contraindicated are very rare. Extreme caution, however, must be used if the drug is given in the presence of renal disease associated with nitrogen retention, in hepatic disease, to pa-

tients with severe anemia or leukopenia or to those who have previously had serious toxic effects from sulfonamides.

In spite of the large numbers of cases included in these reports, they offer no further basis for evaluating the relative efficacy of combined therapy with serum and drug over the use of sulfapyridine alone. Our own experience[36, 77] indicates that it is useful in the cases with the worst prognosis, namely, in bacteremic patients, particularly in those over fifty years of age; those in whom treatment is started late in the disease or whose blood cultures yield moderate or large numbers of pneumococci; in patients with more than one lobe involved; in most patients over sixty years of age who have more than a mild infection; in severe cases of infection with Type 2, 3, or 5 pneumococcus; and in all patients who fail to show adequate improvement within twenty-four to thirty-six hours after chemotherapy is started or who do not tolerate the drug well. Almost all the writers who have had experience with serum therapy agree that this form of treatment should not be abandoned. It is still believed that typing should be done and blood cultures taken before drug therapy is started and serum used in all severe pneumonias due to specific types of pneumococci as soon as it becomes evident that the patient is not responding adequately to the drugs.

Another important result of the use of sulfapyridine which is indicated in many of these reports is the reduction in the incidence of focal purulent pneumococcal complications, particularly empyema. The latter complication is still encountered, but it is now seen mainly in the severest cases or where treatment is inadequate, is undertaken late or is discontinued too soon. The empyemas are usually not affected if they are already well established when therapy is begun. Such cases usually require surgical intervention. In many cases, however, where thin, infected fluid was noted early in the course of treatment, this cleared completely when adequate chemotherapy was maintained, and surgical drainage was thus avoided.

The sodium salt of sulfapyridine may be used for intravenous injections in patients for whom oral therapy is not possible. The Council on Pharmacy and Chemistry of the American Medical Association[78] has advised against its use by other routes, although a number of cases have been successfully treated with intramuscular injections of a 33 1/3 per cent solution[79, 80] and with subcutaneous injections of from 3 to 7 gm. each in a liter of physiological saline solution.[81] Similarly, although rectal administration has been used,[82, 83] it should be avoided, since very little of either sulfapyridine or its sodium salt is absorbed by this route.[84]

It is too soon to determine the exact extent to which chemotherapy has influenced the gross mortality from pneumonia in this country. There has been a steady decline in this mortality during the past few years, as indicated by a reduction in the numbers of deaths reported weekly in public-health reports from various large cities in the United States, and also by the increase in the ratio of cases to deaths reported to the state health departments in New York and Massachusetts. Recent data from these sources indicate a further and greater decline in pneumonia mortality, but this is still considerably less than the reduction to be anticipated from a realization of the full benefits of the present specific remedies.[85] A report by Ordman[86] from South Africa is of interest in this respect. He found that among about 300,000 native laborers in the Witwatersrand Goldfields the incidence of pneumonia has remained fairly constant during the past few years. The case fatality rate from lobar pneumonia, however, which for the five preceding years had been between 11 and 13 per cent, declined to 2.75 per cent during the year after sulfapyridine was put into general use. The case fatality rate from bronchopneumonia dropped from between 13 and 14 per cent to 6.7 per cent in the same period. Of course, there are certain factors favorable to these laborers, notably the comparatively low number of old people and constant medical supervision, which ensured early and adequate treatment. In the United States, with the full realization of the effects of chemotherapy, the usual mortality from pneumonia should be cut more than two thirds, and the estimated 130,000 annual deaths from this disease reduced to below 40,000.* Likewise pneumonia, which was a leading cause of death among soldiers in our army camps during World War I,[87] should not take much toll among our men who may be called to arms in the future.

Sulfanilamide

Additional cases in which sulfanilamide was used in the treatment of pneumococcal pneumonia are noted in some of the recent reports.[26, 28, 36, 42, 88] These included 520 cases treated with sulfanilamide alone, with 98 deaths (18.8 per cent), and 112 cases treated with this drug plus serum, with 25 deaths (22.3 per cent). Lord's conclusion that sulfanilamide is less effective and more likely to produce toxic symptoms than is sulfapyridine has

*Provisional mortality rates for thirty-one states for the first three months of 1940 show a reduction of 20 per cent over the same periods in 1938 and 1939 (*Pub. Health Rep.* 55:1346-1352, 1940).

been fully substantiated by these reports and by our own observations. There is now very little excuse for using sulfanilamide in the treatment of any acute pulmonary infection, except where it is impossible to use sulfapyridine (or sulfathiazole) or, perhaps, in cases caused by hemolytic streptococci.

Sulfathiazole

Many sulfonamide derivatives have been synthesized and studied in the hope of obtaining compounds with greater antibacterial action and less toxicity than those of sulfapyridine. One that has given sufficient promise to warrant extensive clinical trials is sulfathiazole. This compound, together with some closely related ones, was synthesized by Fosbinder and Walter[89] and found to be active against experimental hemolytic streptococcal and pneumococcal infections in mice. Further laboratory studies have indicated that sulfathiazole may be less toxic than sulfapyridine when used in therapeutic doses,[90] and that it is usually as effective as or slightly more effective than the latter in vitro[91–93] and in infections of animals with staphylococci, hemolytic streptococci and pneumococci.[94–99] Clinical reports suggest that it may be useful in the treatment of staphylococcal infections, in pneumonia, in infections of the urinary tract and possibly in a number of other infections.[85, 100–107]

Sulfathiazole is absorbed and excreted more rapidly than is sulfapyridine, and less of the former appears in the blood and urine in the acetylated form. Although somewhat more soluble than sulfapyridine, it is still quite insoluble and must be given orally or, in the form of the sodium salt, intravenously. It is not absorbed well after rectal administration, even when given as the sodium salt. While it is distributed throughout the body in about the same manner as sulfapyridine, it does not penetrate as well into the brain and spinal fluid, and therefore should not be used in the treatment of meningitis.[84, 104, 108–110]

Although numerous clinical studies of the use of this drug have been carried out during the past few months, only a limited number of published reports were available at this writing. From these, and from our experience at the Boston City Hospital, it would appear that its chief advantage over sulfapyridine, from the point of view of toxicity, is that nausea and vomiting are less frequent and considerably less severe. Anemia is less frequent and leukopenia is probably as common. Agranulocytosis occurred after three weeks of treatment with sulfathiazole, and was the cause of death in one of our patients with subacute bacterial endocarditis. Long, thin crystals of the drug are frequently seen in clusters, like sheaves of wheat, in microscopic examination of the urine. Renal complications similar to those observed under sulfapyridine therapy have been reported.[111–113] They probably occur somewhat less frequently, but may be fatal. Drug fevers and rashes are probably more frequent than with sulfanilamide or sulfapyridine. A peculiar type of dermatitis simulating erythema nodosum has been observed, the raised red nodules occurring mostly around the knees and elbows. In addition, conjunctival lesions and an erysipeloid appearance of the malar region and lower lids have been noted.

Sulfamethylthiazole has therapeutic effects similar to those of sulfathiazole. It is much less soluble and is probably more toxic. Its clinical trial has been discontinued owing to the occurrence of cases of severe peripheral neuritis from its use.

In the treatment of pneumonia, both in adults and in children, the results obtained with sulfathiazole have been comparable to or slightly better than those obtained with sulfapyridine.[85, 109, 110, 114] The clinical response, as indicated by the subsidence of fever, is said to be somewhat more delayed. The better results may be due largely to the fact that there is less nausea and vomiting. The same dosage in adults may be employed for both sulfapyridine and sulfathiazole, namely, an initial dose of 2 gm., repeated in two hours and followed by 1 gm. every four hours, day and night, until three or four days after the temperature reaches normal. Some physicians prefer to use a larger initial dose (3 to 5 gm.) or to give 1 gm. every three hours, but neither dose is necessary except in very severe cases. On the same dosage, the blood levels tend to be somewhat lower with sulfathiazole than with sulfapyridine. Sulfathiazole has now been released for sale under the provisions of the recent Food, Drug and Cosmetic Act.

Bacteriology and Immunology

Mention may be made here of a number of recent studies which are of interest and may be of practical significance in relation to chemotherapy and serotherapy of pneumococcal infections.

Effect of Sulfapyridine on the Pneumococcus Capsule

In the early studies on sulfapyridine, Whitby[115] noted degenerative changes in the capsules of pneumococci obtained from experimentally infected mice undergoing treatment with this drug. Telling and Oliver[116] and Lawrence[117] noted that pneumococci in the sputum of sulfapyridine-treated pa-

tients lost the property of swelling with homologous type-specific rabbit serum. This suggested that the drug might act directly on the organisms causing degeneration of the capsule, thus rendering them avirulent and readily susceptible to phagocytosis. From the point of view of the etiologic diagnosis of pneumonia this seemed to explain the frequent failures to obtain satisfactory typing from sputum collected after the institution of drug therapy. Further extensive observations in many laboratories, however, failed to substantiate this idea.[39, 118–122] It is more reasonable to assume that the difficulties in the typing of sputum from drug-treated patients are the result of a decline in the number of the susceptible encapsulated pneumococci, and that this, in turn, is due to the bacteriostatic and bactericidal action of the drug. The finding of large numbers of such encapsulated organisms in the sputum following chemotherapy may be taken as good evidence either that the drug failed to act on that particular strain or that the treatment was inadequate. The latter is the more frequent explanation.

Sputum Studies

Frisch[123] found that the numbers of extracellular encapsulated pneumococci seen in ordinary stained smears of fresh rusty sputum from pneumonia patients may serve as a guide for prognosis. The larger the number of free pneumococci, the worse is the prognosis. Following treatment with sulfanilamide, he found a rapid decline in the number of pneumococci during twenty-four to thirty-six hours, and the organisms often assumed bizarre forms. In some cases, however, the pneumococci again returned to the sputum after two to four days. Our own scattered observations in sulfapyridine-treated cases indicate that the decline in the number of organisms, as already noted, is usually more rapid and more marked and persists during adequate therapy, provided the pneumococcus is a susceptible one.

Frisch also found that following the administration of type-specific antipneumococcus horse or rabbit serums, clumping of the extracellular pneumococci occurred, and in some cases a definite or marked increase in phagocytosis was noted. When such phagocytosis or clumping occurred in untreated cases it was interpreted as representing the development of immunity. The findings in the serum-treated cases are of interest in view of the conflicting evidence concerning the penetration of specific antibodies into the pneumonic lung. They suggest that the antibody may penetrate the infected lung, at least at the periphery of the lesion from which the sputum is presumably coming. Wood's[124] recent studies of experimental pneumonia in rats indicate that penetration may occur even into the center of the consolidated lung. He found clumping, *Quellung* and phagocytosis in his experimentally produced pneumonic rat lungs following the administration of type-specific rabbit serum.

Immunity after Sulfapyridine Treatment

Type-specific antibodies develop in sulfapyridine-treated pneumonia patients at about the same time in the disease as in similar patients who recover spontaneously.[125–128] The same findings have been noted in treated animals recovering from experimental pneumococcal infections.[118, 129, 130] The time when such antibodies appear is independent of the "crisis" when thus induced by sulfapyridine treatment, and their appearance is often delayed for a week or even longer after the temperature has reached normal. Kneeland's[128] findings of a low rate of antibody production in drug-treated cases may be explained by his choice of the precipitin reaction as a test for antibody formation. This test, in our experience, is too crude to detect the low titers of antibody developed by most pneumonia patients. Our own[127] studies indicated that there is probably no difference between spontaneously recovered cases and those recovering following drug therapy, both as to the frequency with which antibodies develop and as to the titers attained.

The late occurrence of antibodies is the usual explanation offered for the relapses so frequently encountered in drug-treated cases, particularly when the treatment is discontinued too soon. Tests for antibodies, either by the Francis[131] skin test with type-specific carbohydrate[125] or by the Sabin[132] stained-slide agglutination test of the serum with homologous type pneumococci,[133] have been suggested as possible guides for discontinuing drug therapy. While useful in certain doubtful cases, these tests are hardly to be recommended for general use in drug-treated cases, since, in the great majority of patients, the treatment may be stopped safely before these tests become positive. On the other hand, when specific serum is used, either alone or in conjunction with chemotherapy, the Francis test may be a useful guide to dosage.[131, 134, 135] When so used, it is essential to carry out a control test with the same material before any serum is given. The positive skin test after serum may be used as evidence for adequate dosage only when the control test gives no reaction.

Drug Resistance or "Fastness"

Pneumococci have been shown to vary in their

susceptibility to the action of the same sulfonamide drugs both in vitro and in therapeutic experiments in animals.[35, 136–141] The differences in susceptibility are a characteristic of the individual strains and bear no relation to the type, although drug resistance of various degrees may be more frequent among the strains of certain types than it is in other types.[93] Resistance to sulfapyridine may be induced in previously susceptible strains both in vitro[142] and in animals with experimental infections that have been treated with subeffective amounts of drugs.[136, 143, 144] Ross[145] has reported a case of pneumococcal meningitis in which resistance was apparently acquired in the course of two or three days of treatment with sulfapyridine.

In recent studies we[93] have succeeded in taking pneumococcus strains which were initially susceptible to the bacteriostatic action of sulfapyridine, sulfathiazole and sulfamethylthiazole and in making them resistant by growth in media containing increasing concentrations of these drugs. Strains accommodated in this manner to growth in one of the drugs not only acquired a high degree of resistance against the homologous drug, but also became resistant to the other two chemicals to approximately the same extent. Individual strains were found to vary in the ease with which fastness could be acquired in this manner. Strains of pneumococci isolated from patients with pneumonia or with purulent infections before treatment with drugs was started were almost all highly susceptible to sulfapyridine, sulfathiazole and sulfamethylthiazole in vitro in concentrations readily attainable in ordinary therapy. We found great differences among individual strains and types. The greatest resistance was found among certain strains of the recently classified Type 33.[146, 147] On primary isolation, some of them grew freely in concentrations as high as 60 mg. per 100 cc. of each of the three drugs studied.

We have also studied strains of pneumococci isolated from patients after several days of drug therapy and during a relapse of the pulmonary infection, and found them relatively resistant to the three drugs. In 2 such cases pneumococci of the same type isolated before the beginning of drug therapy were highly susceptible. The strains from these patients were equally resistant to sulfapyridine, the drug used in the treatment, and to sulfathiazole and sulfamethylthiazole. Our findcount for certain failures of chemotherapy. They also indicate that resistance may be acquired in the course of therapy and may thus account for relapses of the infection while treatment with the drug is being maintained. As a result it is probably futile to change from sulfapyridine to sulfathiazole, or vice versa, in cases in which relapse occurs during apparently adequate therapy with one of these drugs or when adequate therapy is not successful in terminating the disease. Fortunately, the acquisition of drug-fastness in no wise alters the type specificity of pneumococci or their susceptibility to the action of homologous immune serum. Type-specific serum should be used in such cases, and was used successfully in 2 of our cases. These findings offer another argument for continuing the practice of typing in patients with pneumonia before beginning chemotherapy.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26391

PRESENTATION OF CASE

A fifty-two-year-old Italian steel chipper was admitted to the hospital complaining of pain in the right chest.

The patient was well until about six and a half months before admission when he developed a severe toothache, with pain and swelling in and around his mouth and face. The distress became so severe that he was forced to stop his work as a "steel chipper" in a large manufacturing concern, which he had performed for twenty-two years. It was alleged that steel and sand dust were constantly in the air, that at least 50 companion employees had died of "consumption" while he had worked there, but that none of these had died during the five-year interval before the patient's admission. Because of severe pain in the jaw and mouth the patient was able to take nothing but liquid nourishment. Six days later he consulted a dentist and a physician and was treated with cold packs to the face for some three weeks, without much change in his condition. X-ray studies at this time failed to show any evidence of "pus." He was treated symptomatically for a short time and was finally referred to a "specialist," who immediately pulled two lower front teeth and incised the right lower gum. No pus was found, but the pain was relieved, and the swelling decreased slightly. Two days later, while climbing stairs, he suddenly felt a sharp pain in his right chest, and noted a rubbing sensation and "could hear something going pooh-pooh" during respiration. He fainted, was soon revived, climbed another flight of stairs, and then fainted again. A local physician was called, who referred the patient to an outside hospital, where four days later his chest was tapped and 7 ounces of fluid removed. A fever, which he had had for some six or more days, fell to normal, and he felt better for four to five days. His temperature then rose again, and he began to expectorate 6 to 8 ounces of foul-smelling bloody sputum daily. He remained in the hospital for three months without relief, although the amount of sputum diminished. Furthermore, he developed bilateral, slightly tender swellings in the submandibular regions, which were successfully drained. One and a half months before admission he was discharged from the outside hospital, still complaining of transient chest pain which was relieved by wearing a binder around the chest. He continued fairly well for about three weeks, coughed up bloody sputum only twice and was comparatively free of pain. He began to walk about the house and to sun himself on the roof, and was raising only 3 ounces of sputum daily. While at home, however, he developed a painful grapefruit-sized lump in the right upper back. He ran a daily elevation of temperature, felt weak and anorexic, and lost weight. These symptoms continued, he failed to improve, and finally he was admitted to this hospital.

The family, marital and past histories were noncontributory.

Physical examination revealed a well-developed and well-nourished, pale, perspiring man who looked feverish and chronically ill. He coughed frequently, raised purulent sputum with flecks of blood, and complained of chest pain. The eyes showed a slight retinal arteriosclerosis, with bilateral arcus senilis. The teeth were carious, two were absent, and there was pyorrhea, but no other oral abnormalities were noted. The neck presented two pale submental scars. The excursions of the chest were greatly diminished on the right, and there was a definite, non-fluctuant, markedly tender bulge over the right lower chest posteriorly, below the angle of the scapula. This area was flat to percussion, but was neither red nor hot; there were diminished to absent tactile fremitus, breath sounds and whispered and spoken voice over it, but a few fine inspiratory rales were audible. Bronchial breathing was heard in the right axilla, where there was dullness to percussion. There were fine inspiratory rales at the left base with loud consonating rales in the left axilla, without dullness. The left border of the heart was percussed at a point 10 cm. beyond the midline in the fifth interspace. The heart rate was 120, the rhythm was regular, and a moderately loud systolic murmur was heard at the apex. The blood pressure was 120 systolic, 80 diastolic. The abdomen was obese. The remainder of the examination was negative.

Examination of the blood showed a red-cell count of 5,080,000 with 60 per cent hemoglobin, and a white-cell count of 17,800 with 87 per cent polymorphonuclears; the smear showed moderate variation in size and shape of the red cells, with achromia. The sputum was thick, mucopurulent, but otherwise negative. Stools were soft-formed, brown and guaiac negative. A tuberculin test, using a 1:500,000 dilution, was negative. Blood-sugar and blood-protein determinations were normal.

Roentgenograms of the chest and fluoroscopy

revealed that the diaphragm was normal in position, but that the right had markedly impaired motion. The greater part of the right lower lobe in its posterior portion showed consolidation, and there was a cavity in its upper portion that contained air and fluid. The left lung field showed an increase in the linear lung markings, with some mottling. Another film, which included the posterior chest wall, showed the presence of a large cavity along the posterior chest wall on the right side containing air and fluid and extending from the sixth dorsal vertebra downward to the diaphragm.

The temperature was 102°F., the pulse 120, and the respirations 25.

About three days after admission the mass over the right posterior chest became fluctuant, and extended from the level of the eighth rib to that of the second lumbar vertebra. The patient seemed to be fairly comfortable while resting on the left side. He was given supportive care, a transfusion and adequate sedation, and on the ninth hospital day, incisions and drainages of the fluctuant mass, the empyema and the lung abscess were performed under local anesthesia. There was moderate drainage of foul-smelling purulent material, and the temperature fell slightly, but continued to spike daily from 99 to 101°F. A culture of this material showed no growth aerobically; *Staphylococcus aureus* grew anaerobically. Dressings of the wounds were performed periodically, sometimes under Evipal anesthesia. X-ray films of the chest showed no fluid and some decrease in the size of the cavity. About three weeks after the initial operation several small "furuncles" appeared — two in the skin of the neck, one in the skin of the left upper quadrant of the abdomen, and another in the sole of the right foot. The latter two soon "pointed," and were incised and drained. It was noted that in these lesions, as in the chest wound, the nonodorous pus had burrowed deeply in the fascial planes surrounding each of them. Cultures of the pus from the abscesses revealed an anaerobic *Staphylococcus aureus*. The patient was placed on a sulfapyridine regime and the blood level rose to 7.4 mg. per 100 cc. The temperature fell slightly, and he improved somewhat. The neck lesion then became fluctuant, and was incised and drained. Among other things he was given multiple transfusions. He slowly improved: the temperature fell gradually to normal, and he seemed to be symptomatically well, although the lesions were not completely cured since there was still drainage of purulent material from the chest wound and many of the skin lesions. He was finally discharged to a chronic-disease hospital on the sixty-second hospital day.

Differential Diagnosis

Dr. Aubrey O. Hampton: This is the area described at the region of the apex of the lower lobe. It is a large cavity and contains fluid. It has a rather thin, sharply defined wall, not the thick indurated wall you sometimes see.

Dr. Frederick T. Lord: How about the mottling in the rest of the lung fields. The man had been exposed to silica. What about the question of tuberculosis?

Dr. Hampton: There are changes through the mid-portion of the left lung field that might be due to silicosis, but I should question very much if a diagnosis of tuberculosis was made. The cavity has a thin wall, and it might be tuberculous.

Dr. Lord: You shake my faith.

Dr. Hampton: I do not know the answer. I might mislead you.

It is interesting that you can see the diaphragm through this dull area; the lesion is more in the lung than in the pleura, although in the lateral view it extends quite far posteriorly.

Dr. Lord: We know he had something in the pleura — unless they tapped the abscess cavity.

Dr. Hampton: The abscess is very close to the chest wall, and they could have tapped it.

Dr. Lord: Perhaps they did tap the abscess.

Three days after admission the mass over the right posterior chest became fluctuant. We do not see it, do we?

Dr. Hampton: I think it is up in here.

Dr. Lord: It extended from the eighth rib to the second lumbar vertebra. It is said to have been due to an empyema.

We have a patient of fifty-two who worked with dust for a long time. He had an initial disturbance about the jaws, and within a month there was a rather sudden onset of pulmonary disturbance. One of course would think of an infected embolus which had given rise to lung abscess and empyema, which we know he had. One would like to know whether or not the original fluid was bloody. The pulmonary process is very likely secondary to the jaw disturbance. I cannot settle the question of embolism, and I presume no one could. After a couple of months he again had a disturbance about the jaw, and then, three weeks before entrance, he developed an abscess over the right back, with signs that are not of any special interest because we know the findings from the surgical record. He had a secondary anemia with leukocytosis. We do not know the results of blood culture.

Dr. Tracy B. Mallory: A blood culture was taken; one flask showed diphtheroids, and the other, no growth.

DR. LORD: The diphtheroids were probably due to contamination.

DR. MALLORY: I should think so.

DR. LORD: A tuberculin test with 1:50,000 dilution was negative. I should say that the chances were that this man had had tuberculosis. He had been exposed to the disease in his work. It is said that there had been 50 deaths from tuberculosis among those who worked with him, and yet the tuberculin test was negative. I do not believe any importance should be attached to it. Old tuberculin is variable in strength and difficult to standardize. Was old tuberculin used here?

DR. MALLORY: Yes.

DR. LORD: Furthermore, it is undesirable to rely entirely on such a highly dilute solution of tuberculin. The most satisfactory method is an intracutaneous test with 0.1 cc. of a 1:10,000 dilution and, if this is negative, a second test with 0.1 cc. of a 1:1000 dilution. If this is also negative, the patient should be tested and fail to react to 0.1 cc. of a 1:100 solution before tuberculosis can be excluded.

With the history of an initial disturbance about the jaw followed by a pulmonary process, infection with *Actinomyces bovis* must be considered. Perforation of the chest wall, which occurs in over 80 per cent of the cases of actinomycosis, is still further suggestive of the ray fungus as the inciting agent. The streptothrix group of organisms may cause pulmonary lesions, and empyema and perforation of the chest wall may occur, but lesions about the head and neck are not to be expected.

To establish the presence of infection with *A. bovis,* it is often necessary to look with particular care for the granules containing the parasite. The purulent exudate should be spread in a thin layer in a Petri dish and examined against a dark background. Suspicious particles should be removed, crushed between a slide and cover glass and examined under the microscope. Granules made up of a compact mass of branching, gram-staining filaments with radiating, club-bearing filaments at the periphery may be regarded as actinomycotic granules. *A. bovis* is essentially an anaerobe and difficult to isolate in pure culture from material contaminated with bacteria.

The clinical aspects of this case are suggestive of actinomycosis, but not typical. Though a large accumulation of pus in an abscess, such as was present in this case, may occur with actinomycosis, it is uncommon; the lesions are usually indurated and made up of granulation tissue or containing multiple small abscesses.

I should like to ask if *A. bovis* was searched for particularly.

DR. RALPH ADAMS: Not in the beginning. The report was negative.

DR. LORD: That is confusing, and we have to consider three possibilities. The first is tuberculosis, since a negative test with a 1:50,000 dilution of tuberculin cannot be relied on to exclude it. The x-ray findings, however, do not suggest tuberculosis. Furthermore, there was a leukocytosis, which is not likely to be present unless there is a mixed infection. On the whole, I am inclined to exclude tuberculosis. That leaves actinomycosis and a non-tuberculous suppurative process due to infection with a staphylococcus. Between these two, I may say that the clinical aspects were very suggestive of actinomycosis because of the jaw lesions and the perforation of the chest wall. Although empyema and a large accumulation of pus may occur with this disease, they are uncommon. The clinical course is unusually favorable for pulmonary actinomycosis, which has proved to be one of the most serious diseases with which we are confronted — there are only few reported recoveries. It is possible that sulfapyridine favorably modified the course, but we do not yet know what it will accomplish in the treatment of the disease and it should be carefully tried in a series of cases. Too few cases have thus far been treated with the drug to know the answer. If the lesion was a non-tuberculous suppurative process, sulfapyridine might have been helpful in treatment, but is more likely to be effective with septicemia due to this organism. There have been about a dozen cases of staphylococcal septicemia treated with sulfapyridine with apparent success.

I have to leave the diagnosis without reaching a decision between actinomycosis and staphylococcal infection, leaning a little more heavily toward the latter.

DR. DONALD KING: We raised all these questions when we saw the patient on the ward. The other question was whether he had carcinoma of the bronchus with a secondary abscess, but that seemed unlikely.

DR. LORD: Carcinoma has to be considered whenever there is a pulmonary abscess, but I believe these suppurative complications were on an infective rather than a carcinomatous basis.

CLINICAL DIAGNOSES

Empyema necessitatus.
Lung abscess.

DR. LORD'S DIAGNOSIS

Staphylococcal pulmonary infection?
Actinomycosis?

ANATOMICAL DIAGNOSIS

Actinomycosis.

Pathological Discussion

Dr. Mallory: Eventually from incision and drainage of one of the subcutaneous abscesses a fragment of tissue reached the laboratory and was looked at by several members of the staff, who noticed nothing but a marked chronic inflammatory process. Mr. John Homans, Jr., a third-year medical student, looked at the slide and said, "What is this?" And there was a well-formed actinomycotic granule. So I think we have the right to say that the fundamental process was actinomycosis. It is possible that there might have been a superimposed staphylococcal infection, inasmuch as staphylococci were grown on several occasions under anaerobic conditions. If so, it is possible that it modified the picture to some extent.

CASE 26392

Presentation of Case

First Admission. A fifty-one-year-old white, married native salesman entered the hospital complaining of asthma.

One month before entry he developed a mild head cold and two days later noted dyspnea and wheezing for the first time. Following this he had daily attacks of cough, dyspnea and wheezing on exertion and was orthopneic. He continued work until ten days after the onset of this condition. The family history revealed that a sister had hay fever and asthma and that a paternal grandmother had had asthma. Four years before entry all his teeth had been removed. The past history and family history were otherwise noncontributory.

Physical examination revealed a well-developed, moderately obese man who was somewhat dyspneic on exertion. The heart sounds were of poor quality but were regular. The aortic second sound was greater than the pulmonic. There were scattered moist rales posteriorly over both lung bases. The abdomen was tender in the right upper quadrant, but the liver edge was not palpable. There was slight pitting edema of the ankles. The blood pressure was 205 systolic, 140 diastolic.

The temperature was 98°F., the pulse 100, and the respirations 26.

The urine gave a + test for albumin and contained 2 red cells and occasional white cells per high-power field. The blood showed a red-cell count of 4,800,000 with 90 per cent hemoglobin, and a white-cell count of 10,500 with 71 per cent polymorphonuclears. The nonprotein nitrogen of the serum was 34 mg. per 100 cc., the fasting blood sugar 95 mg., and the fasting cholesterol 215 mg. A blood Hinton test was negative. An electrocardiogram showed slight left-axis deviation, late inversion of T_1 and an upright T_4.

X-ray films showed the heart enlarged in all diameters, especially in the region of the left ventricle. No calcification was seen in the region of the aortic or mitral valve. Density was increased in the upper lobes of the lungs; the diaphragm was low. The general appearance was that of cardiac hypertrophy and dilatation, passive congestion in the lungs, fibrosis in the upper lobes and emphysema of the lower lobes.

Three days after entry he saw some visitors, and became very excited and tired. Following this he had a feeling of tightness in the chest and had difficulty in sleeping. The next morning it was noticed that the neck veins were slightly engorged. There was a split, apical first sound. The breath sounds were very distant, and a few moist rales were noted in the low bases after cough. There was no wheeze. The vital capacity was 1930 cc. On the sixth hospital night, dyspnea was severe and he slept little. He coughed considerably and complained of precordial oppression, not sudden in onset but severe and radiating to the left shoulder and scapular region. He showed faint cyanosis, had marked orthopnea and coughing and was in acute distress. The blood pressure was 170 systolic, 100 diastolic. The chest was full of moist rales that obscured the heart sounds. Digitalization was begun on that day. The following morning he complained of pain in the region of the cardiac apex and in the lower left chest posteriorly. He also had pain in the region of the right nipple. The temperature was 101°F., the pulse 100, and the respirations 28; the sputum was white. No rub was heard. The following day he stated that the sputum was blood tinged. On the twelfth hospital day the left base was very dull to percussion and breath sounds were absent. An x-ray film of the chest showed hazy dullness at the left base obscuring the outline of the diaphragm. In the lateral view most of the dullness was seen to lie anteriorly, rising along the anterior chest wall. There was thickening of the septum between the right upper and middle lobes, and the lower lobe was reduced in size. A chest tap at the left base yielded 400 cc. of light-yellow fluid. It had a cell count of 9000 with 63 per cent red cells, 31 per cent lymphocytes, 2 per cent polymorphonuclears and 4 per cent mononuclear cells. His condition gradually improved, and he was discharged on the seventeenth day.

Final Admission (eighteen months later). After discharge he remained in bed for five weeks, and two months later was able to return to work. He continued to work until about three weeks before re-entry, although the dyspnea gradually increased

and he occasionally was somewhat cyanotic. He took digitalis intermittently. The blood pressure was 186 systolic, 126 diastolic, seven months before re-entry, and 220 systolic, 140 diastolic, three weeks before. During the three weeks before reentry he became considerably more dyspneic and wheezed a good deal. He had difficulty in sleeping and had a persistent cough, productive of thick, yellow sputum without blood. He found it necessary to sleep on two pillows at night, and the ankles became very swollen.

Physical examination revealed an overactive, alert, slightly obese man showing Cheyne–Stokes respiration. There was exophthalmos and lid lag bilaterally. Examination of the fundi showed two small hemorrhages on the left and arteriovenous nicking bilaterally. The neck veins were engorged two thirds of the way to the angle of the jaw with the patient resting at a 45° angle. The heart was enlarged both to the right and left, the dullness extending 4.5 cm. to the right and 11.5 cm. to the left of the midsternum. The sounds were rapid and of poor quality, with gallop rhythm over the precordium. The aortic and pulmonic second sounds were equal. There was a soft systolic murmur at the apex. There was slight dullness with decreased breath sounds and voice sounds and moist rales over the left base posteriorly and low in the right axilla. A loud wheeze was heard in the left chest anteriorly. The blood pressure was 175 systolic, 110 diastolic. The liver was felt 3 cm. below the costal margin; it had a tender smooth edge. No abdominal fluid could be demonstrated. Both lower extremities showed pitting edema extending to the knees.

Urine examination showed a specific gravity of 1.022, with a +++ test for albumin and 10 red cells and an occasional white cell per high-power field. The red-cell count was 4,500,000 with 85 per cent hemoglobin, and the white-cell count 10,400 with 76 per cent polymorphonuclears. The serum nonprotein nitrogen was 32 mg. per 100 cc., and the protein 7 gm.

An electrocardiogram showed slight to moderate left-axis deviation, a finding that suggested left ventricular strain, and an auricular rate of 150. X-ray films showed the heart extending almost to the left axillary line. There was dullness suggesting fluid at the left lung base, and diminished radiance throughout both lungs with thickening of the lung markings.

On the second hospital day the patient developed a sharp knife-like pain in the right side. It came on suddenly and was exaggerated with deep inspirations. It increased in severity, and the patient became very pale, the skin moist and cold, and the pulse rapid. The blood pressure was 160 systolic, 90 diastolic. The heart sounds did not change, but there was a friction rub in the right axilla. Morphine gave partial relief. The patient was very apprehensive about the condition, but the following day he was much better. During the night he had had marked diuresis. Although the pain had gone, a friction rub was still heard in the right axilla. Moist rales were sparsely scattered throughout the chest. The breath sounds were diminished in certain areas, loud in others. On the sixth hospital day the condition was essentially the same. The temperature had remained constant at 97 to 98.6°F., the respirations at 25 to 30. On the seventh hospital day an electrocardiogram showed a severe degree of heart block, with a PR interval of 0.25 second and occasional dropped beats. A wide P wave, a slurring of the QRS complex and an absent R_4 suggested a change. T_1 and T_2 were low, and ST_4 was elevated. There was a gallop rhythm and an auricular rate of 100. The pulse rate was increased, and the patient complained of abdominal distress and gas.

A sixth of a grain of morphine, a dose of Salyrgan and an enema were given on the seventh day. The following day the heart sounds were regular, and the chest was clear except for fine moist rales at the left base. The patient was greatly improved and said he had spent the best night in years. On the eleventh hospital day he was again apprehensive, and dyspneic on exertion; and the heart showed split first and second sounds. On the thirteenth day the dyspnea was worse and he had a Cheyne–Stokes type of respiration, with cyanosis. Bronchial breathing was heard over the right upper lobe posteriorly. Only a few crackling rales were heard at the bases. The blood pressure was 230 systolic, 120 diastolic. The next day he was again remarkably improved. It was noted that the neck veins collapsed on inspiration. He had some expiratory difficulty, and the diaphragm was low in position. During the night, in spite of increased morphine, he was restless and on one occasion got out of bed. The cyanosis and Cheyne–Stokes respiration were relieved by the use of an oxygen tent. The heart was regular, and there were no remarkable chest signs to explain these symptoms.

On the fifteenth day the blood pressure dropped to 160 systolic, 100 diastolic, but the heart sounds were regular and the pulse was 80. There were wheezing rales, and expiration was longer than inspiration. He was acutely disturbed mentally, delirious and overactive. The following day the blood nonprotein nitrogen was 44 mg. per 100 cc. The white-cell count was 12,000 with 85 per cent polymorphonuclears. Harsh breath sounds were

heard under the right clavicle, with coarse rales. The left base was relatively dull to percussion. He had no peripheral edema or ascites. The blood pressure was 180 systolic, 120 diastolic. On the twentieth hospital day he was essentially the same but looked somewhat better and, although drowsy, talked rationally. There was gallop rhythm along the right border of the sternum, and a sinus arrhythmia was noted.

He died quietly on the twenty-second hospital day.

Differential Diagnosis

Dr. Paul D. White: Asthma is most commonly the result of a reaction to disease of the lung or pleura of an anaphylactic reaction, or of a reflex due to pulmonary congestion from heart disease. Several causes may act simultaneously.

This patient's family history is not important. Most families will show at least one member with asthma or hay fever.

"The heart sounds were of poor quality. . . ." That is important if the poor quality was not the result of pulmonary emphysema. "The aortic second sound was greater than the pulmonic." It would be of some importance to know if either one was accentuated. I should judge that they must have been accentuated, at least the aortic. The rales could have resulted from respiratory infection as well as from congestive heart failure. The edema of the ankles is not very important. It may be due to local circulatory trouble or obesity — he was a heavy man. The liver was not enlarged. Slight pitting edema of the legs may come, however, before the liver grows very large.

Then we arrive at the first important point so far as the circulation is concerned — the blood pressure. It indicates that the heart may have played a role in this asthma and dyspnea, but there is no statement as yet of heart size and evidently there were no heart murmurs.

The laboratory tests were all relatively normal, — the cholesterol was on the upper edge of normal, — helping to rule out the later suggestion of thyrotoxicosis.

I have looked at the electrocardiogram and found that there is only slight inversion of T_1, not very impressive, but nevertheless abnormal. An upright T_4, if the record was taken according to the old technic, is evidence of disease. The left-axis deviation is significant. The changes do suggest coronary disease, aside from left ventricular enlargement.

"X-ray films showed the heart enlarged in all diameters. . . ." That is the second important point. May we see the first x-ray film?

Dr. Aubrey O. Hampton: It does appear that the upper lobes are dense, particularly on the left side in the region of the upper lobe, and the lungs fairly radiant at both bases in spite of the fact that there is beginning pleurisy or pleural effusion on the left side. The blood vessels are large on both sides and are visible even to the periphery of the lungs. The heart shadow is a little wider across the base than is usual with simple left ventricular hypertrophy. This may be due to decompensation.

Dr. White: I should be in favor of cardiac enlargement from hypertensive heart disease, with some cardiac failure and some change in the lungs.

". . . he had a feeling of tightness in the chest. . . ." The question comes up as to the significance of this feeling of tightness. It was possibly due to coronary thrombosis. That is the third important point in this story of heart failure. There was evidence of right-sided heart failure, hence confirming the suspicion that the left heart had already failed.

The respiratory infection may have had more to do with the earlier dyspnea than had the heart failure, although there may have been subsidence of congestion of the lungs when right-sided heart failure began.

The pain in the region of the cardiac apex and left chest suggests pulmonary infarction rather than coronary thrombosis. The temperature, pulse and sputum would fit in with pulmonary infection. May we see the x-ray films taken at that time?

Dr. Hampton: This film was taken eleven days after the first. It seems to show a smaller heart and an accumulation of fluid at the left base. Also both lung roots look smaller at the time when he was apparently getting worse. There is this queer shadow posteriorly, which apparently is on the left side in the costophrenic angle. It is convex upward instead of the usual concavity of fluid, which he previously showed in the costophrenic angle. We have seen this picture with infarcts, particularly those in the costophrenic angle.

Dr. White: He had been taking digitalis, and this fact may have had a great deal to do with his improvement. His doctors should have begun it earlier, of course, probably at admission when he complained of dyspnea. I think it would be quite interesting to know whether he was already under the influence of digitalis and had benefited from that before the second film was taken. The decrease in heart size may have been the result.

"During the three weeks before re-entry he became considerably more dyspneic and wheezed a good deal." We do not know that there was respiratory infection at that time, but the sputum suggests it. We do not get thick, yellow sputum from pulmonary infarction alone or from congestive failure. It is conceivable that he had a per-

sistent or recurrent pulmonary infection. I do not believe we have any clear evidence that he had bronchiectasis, but he may have had it.

I should like to ask if the sputum was examined for tubercle bacilli. Why should he have had so much sputum unless he had some infection?

DR. TRACY B. MALLORY: The sputum was negative for tubercle bacilli.

DR. WHITE: "There was exophthalmos and lid lag bilaterally." That is the only suggestion of thyrotoxicosis and there is nothing else to bear it out. I think we can ignore it.

"A loud wheeze was heard in the left chest anteriorly." As a rule with congestive failure the signs are more definite on the right side rather than on the left. This finding suggests that he had the remains of an infarct or infection in the lungs.

The pitting edema extending to the knees means congestive failure approaching the end.

DR. HAMPTON: In this film the heart has increased markedly in size and the pulmonary vessels are markedly dilated. The density at the left base is not so marked as that at the examination nearly two years before, but there is definite evidence of pleural disease.

DR. WHITE: A significant point is that the auricular rate was so rapid. Whether that was due to a new rhythm plus heart block resulting from the heart disease and failure I do not know, but the rate is distinctly more rapid — 150 as compared to 100 a few days before. I judge he had been continuing with digitalis. Sometimes overdigitalization will produce a disturbance of this sort, but we have no proof of that here; the T waves do not seem to indicate poisoning from digitalis.

In summary, I shall put down that he had hypertensive and probably also coronary heart disease, as shown better by the electrocardiogram than by the clinical signs, with congestive heart failure precipitated by acute pulmonary infection or infarction and complicated by multiple myocardial infarcts. Pulmonary infection is indicated by the thick yellow sputum. Cancer of the lung is a remote possibility.

CLINICAL DIAGNOSES

Bronchial asthma.
Generalized arteriosclerosis.
Arteriosclerotic and hypertensive heart disease.
Cardiac decompensation.
Coronary occlusion.
Bronchopneumonia.

DR. WHITE'S DIAGNOSES

Hypertensive and coronary heart disease.
Congestive heart failure.
Pulmonary infarction or infection.
Multiple myocardial infarcts.

ANATOMICAL DIAGNOSES

Hypertrophy of the heart, hypertensive type.
Myocardial fibrosis.
Coronary sclerosis with thrombosis.
Bronchiectasis, right upper lobe.
Pulmonary infarction, healed, left lower lobe.
Bronchopneumonia.
Nephrosclerosis.
Arteriosclerosis, cerebral.
Chronic passive congestion.

PATHOLOGICAL DISCUSSION

DR. MALLORY: As Dr. White predicted, the most important underlying process in this patient was hypertensive heart disease. The kidneys showed extensive vascular disease of the type regularly associated with chronic benign hypertension. The heart itself weighed 800 gm., with hypertrophy and dilatation of all the chambers but with preponderant changes on the left side. The left coronary artery was markedly sclerotic, and a fresh thrombus was found in the left descending branch. No corresponding area of acute infarction could be made out in the myocardium, but the left ventricle showed extensive patchy fibrosis and rather marked thinning of its walls at the apex.

From the pathological point of view the most interesting findings were centered in the lungs. The density noted on x-ray examination in the right-upper-lobe field was due to a fairly extensive area of bronchiectasis, which extended up from the middle-lobe septum in a triangular area 6 cm. in length and 4 cm. in width at its lower margin. In the left lower lobe at the costophrenic angle was an area of marked thickening of the pleura with underlying fibrosis of the pulmonary parenchyma about 1 cm. in width. On microscopic examination this showed complete obliteration of the lung architecture with dense masses of intertangling elastic fibrils, a characteristic appearance of a healed infarct of the lungs. Several vessels in the immediate neighborhood showed recanalized thrombi. This clearly checks with the episode of his first admission when he had sharp pleural pain in the lower left chest, dullness at the left base on x-ray examination, and hemoptysis. The other findings of significance were a slight terminal bronchopneumonia and rather extensive cerebral arteriosclerosis with many minute microscopic areas of softening of the brain.

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BUSINESS CENSUS OF HOSPITALS

IN 1939 the United States Public Health Service published a survey* of the great proportion of the hospitals of this country as one of the units of the census of American business for 1935, conducted by the Department of Commerce.

The material of this brochure was obtained from questionnaires returned by the hospitals and from the study of data accumulated by the American Medical Association and other sources dealing with registered hospitals having 1,076,350 beds. These figures do not include about 1900 institutions not approved as hospitals by the American Medical Association, because these are considered to be more or less substandard, even though they serve localities in a worthy manner. Another small group is not included because of subsidiary relations to parent institutions that complicate analyses of comparative expenses of administration. These excluded facilities, however, are not large enough to invalidate the estimated facts by their omission.

The recorded facts and conclusions are restricted to conditions in 5944 registered federal, other governmental (state, county and city), non-profit and proprietary hospitals, further subdivided to include institutions for general and special care, mental illness and tuberculosis.

Elaborate informative statistics, covering income, expenses, plant assets, employed personnel, including physicians, residents, interns, nurses, students, technicians and other employees, together with administrative and clerical staffs and many other essential features of hospital functions are set forth in many figures and tables.

In order to give comparative conditions throughout the country, the states are put into four groups, representing problems in hospitalization according to distinctive areas. The northeastern section includes the New England states, New York, New Jersey, Pennsylvania, Delaware, Maryland and the District of Columbia; the southern, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma and Texas; the central, Ohio, Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas; and the western, Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon and California. Within these areas there are subdivisions explanatory of reasons for special designation. The population of the geographical groups is 38,261,000 in the northeastern, 37,576,000 in the southern, 39,300,000 in the central and 12,384,000 in the western.

The comparative studies of these areas show that, using the 1935 census in the northeastern group, Massachusetts has 12.28 beds per 1000 inhabitants and New York has 12.05; whereas Virginia is the highest in the southern section, with 6.14, Colorado in the western, with 10.10, and Minnesota in the central, with 9.74. Taking general and special hospitals alone, Nevada leads

*Pennell, E. H.; Mountin, J. W., and Pearson, K.: Business census of hospitals, 1935. Supplement No. 154, *Public Health Reports*. Washington: Government Printing Office, 1939.

in the western group, with 5.80 beds. In the northeastern group, the District of Columbia has 5.55; in the central, Minnesota has 4.10; and in the southern, Louisiana has 2.58. Under hospitals for mental illness, New York in the northeastern group leads with 6.74 beds, with Massachusetts second with 6.33. Wisconsin tops the central group, with 5.17; Oregon, the western, with 4.78; and Virginia, the southern, with 3.74. The proportion of hospitals for tuberculosis is highest in Colorado of the western area, with 1.69 beds; Rhode Island leads the northeastern group, with 1.22; Minnesota, the central, with 0.80; and Virginia, the southern, with 0.43.

In dealing with the financial problems of hospital administration it is admitted that conditions vary so much according to localities, size of hospitals and personnel services that comparisons necessitate an understanding of all these details. For example, in payrolls in institutions managed by certain religious orders some of the professional services are contributed free, and federal hospitals have on the average larger staffs than those found in most civilian institutions.

In the tables giving figures for the annual payments to hospitals per capita of the population, attention is called to Massachusetts where in 1935 the inhabitants paid toward the upkeep of general and special hospitals $7.05, about 56 per cent of which came from patients' fees, 21 per cent through taxes and 23 per cent through other sources. For mental institutions, of $3.00 expense per capita, 15 per cent was paid by patients, 84 per cent by taxes and 1 per cent otherwise, and for tuberculosis, the per capita cost was $1.04 with 10 per cent paid by patients, 84 per cent by taxes and 4 per cent unclassified. Massachusetts leads all states in total payment, the figure being $11.09, which is the sum of $7.05 for general and special care, $3.00 for mental illness and $1.04 for tuberculosis. This compares with the average figures for all states of $4.90, $3.37, $1.14 and $0.39 respectively.

The source of hospital income in Massachusetts is of interest. For general and special care 56 per cent was derived from patients, 21 per cent from taxes and 23 per cent otherwise. The percentages of income paid to hospitals for mental illness were 15, 84 and 1 respectively, and those to tuberculosis hospitals 10, 86 and 4. These figures and the corresponding ones for the other states demonstrate the importance of income derived from taxes in the payment for hospital care.

Included in the income of hospitals is that from endowments, but the amounts are comparatively small, although many of the non-governmental group make appeals for aid from charitable organizations. Such income provided only 3.9 per cent of the cost of maintenance of general and special hospitals; the largest percentage, moreover, was among hospitals of 150 or more beds in the northeastern section.

The personnel and payroll section gives the facts existing as of October, 1935. Only employees in hospital service are included, and the analysis consists of three parts — the pay status, position and proportion of the payroll drawn by each class in geographic location, control and bed capacity. Military hospitals are excluded in the parts pertaining to personnel and payroll because the size of the staffs is not comparable with civilian hospitals on account of the necessity of providing for unusual peak loads. In the comparisons, the size of the hospital, rather than the location, seemed to determine differences in expenditures, although the percentage of the number of employees was larger in the northeastern section of the country, as was also true of the value of plant assets.

The figures and tables in this report are an important contribution relating to registered hospitals in the United States, and warrant study by all interested in or responsible for the administration of hospital problems.

IS IT A GAME?

THE shortening of the days and the turning of the leaves herald the approach of another football season. Whether this is eagerly anticipated or viewed with alarm depends on one's opinion concerning the benefits of this form of athletic con-

test. Modern football demands of the player a splendid discipline, self-control and a subordination of the individual to the team. Today it might well be given a place in the list of those character-building activities William James suggested in his essay, "The Moral Equivalent of War."* Whether these good qualities outweigh the evils of "overemphasis" and "a game for gate receipts only" is debatable. Without taking sides on this point, it cannot be denied that there are few universities, colleges or even schools which have not been accused of professionalism in football to a greater or less degree.

The element of serious injury to the player is far less of a problem today than it has been in the past. However, as is pointed out in an article in this issue of the *Journal,* safety for the player is apparently to be obtained only with careful supervision by a competent personnel. The author quotes figures that seem to show that the danger of serious injury in this sport is at a minimum only when there is adequate medical supervision and when the rules are enforced by competent officials. He very properly states that it is in the unsupervised games that serious injury is most likely to occur, and also suggests that his figures show that serious injuries can be prevented under nearly ideal conditions. Such conditions, however, are not obtained in a large percentage of cases. As long as the colleges play football the schools will probably do likewise, as will the groups of sand-lot players.

There is one aspect of this question that is seldom referred to, although it has an important bearing on the large number of seriously crippling joint injuries. Thirteen to seventeen years cover the ages of most schoolboy and "sand-lot" participants of this game. For many boys this is a period of rapid skeletal growth, and their muscular and ligamentous strength does not always keep pace with their bony growth. "Their legs are long and their joints are loose," they are clumsy, and they do not co-ordinate well. To subject them to the danger of joint injury during an age when their joints lack the normal muscular and ligamentous support that will come a year or two later is to court disaster. Knee injuries at this age may, and often do, result in a joint that is never again able to stand the stress of even ordinary sports. It is probable that the number of boys incapacitated for college football because of knee injuries sustained in secondary schools is far larger than is shown by any available statistical data. And it is not only at the schools with inadequate medical supervision that such accidents occur.

No trainer of race horses would allow a two-year-old to run in steeplechases. To do so would almost inevitably result in a "breaking down" of the joints; he is then of no further use in racing, and is often "destroyed." In many cases, the boy of thirteen to seventeen is similar, structurally and physiologically, to the two-year-old colt. And, if so, his joints should not be subjected to the stress of football. The coach who appreciates the dangers inherent to this age group is a great rarity. Even a greater rarity is the coach who will not allow a rapidly growing, though perhaps fast and heavy, boy to take part in the sport. There have been times when it has seemed that the fate of the "broken-down" colt had better been meted out to the enthusiastic but woefully ignorant coach who allows a candidate of this age and type to play the game.

The professional athlete appreciates that he is only as strong as his legs, and he spends many hours of drudgery on "road work." The average schoolboy concentrates on a beautifully developed torso and arms. With walking now reduced to a minimum, a pair of sturdy legs and knees is far less common than it was in the days before the automobile.

If schoolboy football is to be reasonably safe only when medical supervision of the elaborate and expensive type advocated in this article is furnished for all participants of all ages, one might well ask, Is it worth while? and, Is it a game?

*James, W.: *Memories and Studies.* 411 pp. New York: Longmans, Green & Co., 1911.

MEDICAL EPONYM

Dupuytren's Contracture

The first published description of this condition occurs in *Leçons orales de clinique chirurgicale faite à l'Hôtel-Dieu de Paris,* by Guillaume Dupuytren (1778–1835), chief surgeon of the hospital. This consists of a series of lectures collected by his former students and published at Paris in 1832. A portion of the translation from "Rétraction permanente des doigts par suite d'une affection de l'aponévrose palmaire [Permanent Retraction of the Fingers Following an Affection of the Palmar Aponeurosis]" follows:

> Perhaps on investigation one might find descriptions of this condition in the works of other authors, but my life, devoted as it is to action, has not permitted me to read them all, and I shall be very happy to learn that those who have preceded me and have written about this condition have found the cause and the proper means to be employed for its cure. . . . Those persons who have a predisposition to the condition which we are describing notice that extension of the fingers of the affected hand is less easy than before. The ring finger is soon drawn down. The changes are next perceived in the first finger, and the others follow. In proportion to the progress of the disease, the ring finger is more and more contracted. It is at this stage that flexion of the two neighboring fingers is striking. . . . When the ring finger is markedly contracted, the skin shows folds with the concave side toward the finger and the convex toward the articulation of the wrist with the radius. These folds are the result of natural adhesions between the skin and the altered structures beneath. . . . If one palpates the palmar aspect of the ring finger, a tense cord is felt.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

Raymond S. Titus, M.D., *Secretary*
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Cesarean Section, Followed by a Fatal Pneumonia

Mrs. A. B., a thirty-eight-year-old essential para II, entered the hospital in mild labor on September 19, 1939.

The family history was negative except that one brother had tuberculosis. The patient's past history included the usual children's diseases. She had had bronchitis more or less all her life. There was a question of tuberculosis, which had never been proved. The appendix and an ovarian cyst had been removed in 1930. Catamenia began at fourteen, were regular with a twenty-eight-day cycle and lasted five days. The first pregnancy terminated in a miscarriage at two months and was followed by the above operation one month later. The second pregnancy ended in a difficult, high-forceps delivery after a thirty-hour labor. The present pregnancy had been normal in every respect.

As the head did not engage, a low-cervical cesarean section was done at 8 a.m. on September 20. There were no complications, and a female child weighing 6 pounds, 15 ounces, was delivered in good condition. A clysis of 1000 cc. of 5 per cent glucose solution was given at the close of the operation, and the patient was returned to bed in good condition.

On September 21, the temperature was 101 to 103°F., the pulse 110 to 140, and the respirations 20 to 30. The patient coughed and raised mucus all night. A diagnosis of pneumonia was made, and sulfapyridine started, 15 gr. every four hours. On September 22 the temperature was 101 to 102°F., the pulse 110 to 130, and the respirations 30. The patient was still coughing, and was nauseated.

On September 23 the patient became steadily worse. The temperature was 102.8°F., pulse 130, and the respirations 30. Sulfapyridine was discontinued, and Prontosil started, 5 cc. every four hours for three doses. The next day the temperature, pulse and respirations were still elevated and nausea and vomiting continued. The Prontosil was discontinued, and sulfapyridine started again at 6 p.m., 10 gr. every four hours, with sodium bicarbonate. On September 25 the sulfapyridine was increased to 15 gr. every four hours. The patient's condition was little changed: the temperature was 101.5°F., the pulse 132, and the respirations 50.

The patient gradually grew worse, and she was placed in an oxygen tent on September 26. Sulfapyridine was omitted at 6 p.m. on September 27. The following day the temperature was 98.6 to 100.5°F., the pulse 130 to 140, and the respirations 40 to 50. Her condition was very bad, and she was given two doses of insulin, 10 units at 4:35 a.m. and 20 units at 8:30 a.m. The patient was seen in consultation at 11:45 p.m. The consultant's note reads as follows: "Evidence of pulmonary consolidation exists in both chests posteriorly; front and back there are numerous rales, moderately moist but not marked. The heart is regular and rapid, and the sounds are of fairly good quality. The blood pressure is 130 systolic, 80 diastolic. The color is fair. The patient is restless, with rapid

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

respirations and difficult breathing. The abdomen is soft. The picture is one of a patient with a normal temperature and increased pulse and respiratory rates. There is no evidence of circulatory collapse. The treatment of the infection has been adequate. I think the trouble is restlessness, respiratory difficulty and exhaustion. I suggest plenty of morphine and one large dose of atropine (1/50 gr.)."

The patient continued to grow worse, and died at 5:30 a.m. on September 29.

Comment. Pneumonia following cesarean section presents the same hazard that it does after any abdominal operation. This is true whether it is an inhalation pneumonia or an ordinary pneumonia developing after operation without any apparent connection with the anesthesia. This hazard should always be taken into consideration when the operation of cesarean section is entertained. It is one of the reasons why spinal anesthesia is becoming more generally employed. The indication for cesarean section in this particular instance was based on the previous history of a difficult delivery. It is incontrovertible that pneumonia following a normal delivery is not the same hazard as pneumonia following an abdominal operative procedure.

During the past few years so much work and comment have been directed to the problem of the management of pneumonia — or, better, pneumococcal infection — that one may be permitted to make certain definite statements without specific reference to the literature.

Recent developments in the fields of specific serotherapy and of chemotherapy have focused attention on the etiologic agents in the pneumonias. Present-day diagnosis and management of pneumonia should include: examination of the sputum or throat secretions for specific-type organisms; a blood culture; and an x-ray film of the chest wherever possible. All this should be done before treatment is instituted.

It has long been recognized that pneumonia is a serious complication of pregnancy and that the death rate is considerably higher than that for nonpregnant women. Such being the case, the pregnant woman who has a pneumococcal infection is entitled to all the treatment available to combat the disease. Chemotherapy may be, and frequently is, sufficient, but the combination of chemotherapy and serotherapy should be used wherever necessary and possible. If chemotherapy is instituted before bacteriological studies have been made on the sputum or throat secretions and the blood, later studies may fail to reveal the etiologic agent, due to the effect of the drug. On the other hand, if proper bacteriological studies are instituted before chemotherapy is started, then in the event that chemotherapy proves ineffective or that the blood culture is positive, the physician is able to use the proper type serum, which, in combination with chemotherapy, may well save the life of the patient.

It is pertinent to the above clinical case to repeat some of Finland and Dublin's* observations made as a result of a study of 212 cases of pneumococcal pneumonia complicating pregnancy and the puerperium at the Boston City Hospital and the Boston Lying-in Hospital: The incidence of pneumococcal types in these cases was similar to that found in all cases of pneumonia in adults; bacteremia was more frequent and the death rates were higher than they were in corresponding cases for the same age groups; the death rates were highest in late pregnancy and in those women whose pregnancies were terminated during the disease.

Assuming that the above general observations will hold, further comment on the case presented above is unnecessary.

*Finland and Dublin: Pneumococcic pneumonias complicating pregnancy and the puerperium. *J. A. M. A.* 112:1027-1032, 1939.

DEATHS

LOVELL — David B. Lovell, M.D., of Worcester, died September 18. He was in his seventy-sixth year.

Born in West Boylston, he received his degree from Columbia University College of Physicians and Surgeons in 1889. For several years he was on the staff of Mt. Sinai Hospital in New York City. He was a member of the staffs of the Memorial Hospital and St. Vincent Hospital in Worcester. Dr. Lovell was a fellow of the Massachusetts Medical Society and the American Medical Association and held memberships in the American Ophthalmological Society, American Otological Society, and the New England Ophthalmological Society.

His widow and a son survive him.

WORMELLE — Charles B. Wormelle, M.D., of Allston, died September 16. He was in his sixty-ninth year.

Born in Brighton, he attended Harvard University and received his degree from the Harvard Medical School in 1898. He was a former member of the staffs of the Boston City Hospital and the Children's Hospital. His memberships included the Massachusetts Medical Society and the American Medical Association.

His widow, three daughters and a brother survive him.

NEW HAMPSHIRE MEDICAL SOCIETY

DEATHS

BEATON — Alexander A. Beaton, M.D., of Franklin, died at Flat River, Prince Edward Island, on August 22. He had practiced medicine in Franklin for forty years.

Dr. Beaton was born at Flat River, Prince Edward Island, on April 7, 1872. He graduated from Dartmouth Medical College in 1898 and practiced medicine in Webster and Salisbury before moving to Franklin in 1899. He served three years as a member of the Franklin City Council and was mayor of the city in 1916 and 1917.

Dr. Beaton is survived by a brother and sister.

BARTLETT — WALTER A. BARTLETT, M.D., aged fifty, of Manchester, died on August 12 at the Glencliff Sanatorium after an illness of several months.

Dr. Bartlett was graduated from Dartmouth Medical School in 1911. He served his internship at the Mary Hitchcock Hospital in Hanover and then pursued special studies in New York City before starting the practice of surgery in Manchester in 1912. He had been a member of the Board of Education for eight years. Dr. Bartlett was a member of several social and fraternal organizations as well as local, county and state medical associations.

Survivors are his widow, Mrs. Hazel M. Bartlett, three sons, Walter A., Jr., Arnold W. and Thomas E. Bartlett, and a daughter.

GOLDSMITH — CHESTER L. GOLDSMITH, M.D., who had practiced in Winchester, New Hampshire, for seventeen years, died at the age of sixty years on July 26.

Dr. Goldsmith graduated from the Maryland Medical College in Baltimore in 1912. He also did undergraduate work at Milton University in Baltimore and at Johns Hopkins University School of Medicine.

Dr. Goldsmith was a member of the Odd Fellows and Masons.

PHERSON — FRANK J. PHERSON, M.D., of Manchester, died in Boston after a short illness, on August 27. He was a graduate of Jefferson Medical College in 1908.

MISCELLANY

NOTES

Dr. J. Richard Weissenberg has been appointed professor of histology and embryology at the School of Medicine of Middlesex University. He was formerly professor extraordinarius of anatomy at the University of Berlin; in 1937 he was made visiting professor of cytology at Washington University, St. Louis, and in 1939 a member of the Wistar Institute, Philadelphia.

It has been recently announced that Dr. Edwin B. Astwood, associate in obstetrics at the Johns Hopkins University School of Medicine, will become assistant professor of pharmacotherapy at the Harvard Medical School and a member of the medical staff of the Peter Bent Brigham Hospital.

NOTICES

ANNOUNCEMENT

L. ROBERT WEISS, M.D., announces the removal of his office from 371 Commonwealth Avenue to 483 Beacon Street, Boston.

JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston
Lecture Hall, 9–10 a.m.

MEDICAL CONFERENCE PROGRAM, OCTOBER–NOVEMBER

Tuesday, October 1 — Differential Diagnosis of Certain Diseases of the Spine. Dr. J. D. Adams.
Wednesday, October 2 — Hospital case presentation. Dr. S. J. Thannhauser.
Thursday, October 3 — Cardiovascular Clinic. Dr. John Homans.
Friday, October 4 — Carcinoma of the Breast. Dr. E. M. Daland.
Saturday, October 5 — Hospital case presentation. Dr. S. J. Thannhauser.
Tuesday, October 8 — A Case Study of Adrenal Deficiency in an Infant. Drs. F. C. McDonald and N. T. Werthessen.
Wednesday, October 9 — Hospital case presentation. Dr. S. J. Thannhauser.
Thursday, October 10 — Immunity in Upper-Respiratory Infections. Dr. Leonard Asher.
Friday, October 11 — Routine Office Cardiovascular Disease. Dr. S. A. Levine.
Saturday, October 12 — Hospital case presentation. Dr. S. J. Thannhauser.
Tuesday, October 15 — Steroid Hormone Excretion Rates Associated with Dysmenorrhea. Drs. N. T. Werthessen and R. E. Brownlee.
Wednesday, October 16 — Hospital case presentation. Dr. S. J. Thannhauser.
Thursday, October 17 — Nephritic Clinic. Dr. R. W. Buck.
Friday, October 18 — Recent Advances in Anesthesiology. Dr. F. W. Marvin.
Saturday, October 19 — Hospital case presentation. Dr. S. J. Thannhauser.
Tuesday, October 22 — Title to be announced.
Wednesday, October 23 — Hospital case presentation. Dr. S. J. Thannhauser.
Thursday, October 24 — Hemorrhagic Diathesis. Dr. Eugene Lozner.
Friday, October 25 — Clinicopathological conference. Dr. Fuller Albright.
Saturday, October 26 — Hospital case presentation. Dr. S. J. Thannhauser.
Tuesday, October 29 — Food Allergy. Dr. E. A. Brown.
Wednesday, October 30 — Hospital case presentation. Dr. S. J. Thannhauser.
Thursday, October 31 — Title to be announced.

BOSTON DOCTORS' SYMPHONY ORCHESTRA

The Boston Doctors' Symphony Orchestra will resume rehearsals under Alexander Thiede, on Thursday evening, October 10. Those interested in becoming members should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

CHILDREN'S HOSPITAL

Beginning October 2, the weekly clinicopathological conferences at the Children's Hospital will be held every Wednesday at 12:00 noon in the amphitheater. Physicians and medical students are cordially invited to attend.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, October 8, in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance), at 8:15 p.m. Dr. John Scudder, instructor of surgery, College of Physicians and Surgeons, Columbia University, will speak on the subject "Shock: Blood studies as a guide to therapy."

Medical students and physicians are cordially invited to attend.

JEWISH MEMORIAL HOSPITAL

There will be a staff meeting of the Jewish Memorial Hospital in the hospital auditorium, 45 Townsend Street, Roxbury, on Monday, September 30, at 8:30 p.m. Dr. Reginald Fitz will speak on "Diabetes and the General Practitioner," followed by an open discussion. A collation will be served.

Physicians and medical students are invited.

FOUR COUNTY MEDICAL SOCIETY

The annual meeting of the Four County Medical Society, comprising the district societies of Berkshire, Franklin, Hampden and Hampshire, will be held on Wednesday, October 9, at the Sheraton Hotel (formerly the Hotel Stonehaven), 70 Chestnut Street, Springfield. The meeting is scheduled for 9:30 a.m.; luncheon will be served at the Sheraton Hotel at 1:00 p.m.

The meeting will be in the form of a symposium, "Dyspnea and Edema: Their significance in diagnosis and prognosis." Dr. Soma Weiss will discuss the viewpoint of general medicine; Dr. Edward D. Churchill, general surgery; Dr. Foster S. Kellogg, obstetrics and gynecology; and Dr. Burton E. Hamilton, cardiology.

All physicians of Western Massachusetts are welcome to attend.

SIXTH POSTGRADUATE SEMINAR IN NEUROPSYCHIATRY

The Metropolitan State Hospital, Waltham, recently announced the opening of the Sixth Postgraduate Seminar in Neuropsychiatry.

The course consists of two units: neurology, September 30 to December 17; and psychiatry, January 6 to March 24. It is designed as a comprehensive review course, not only for physicians preparing for the examinations of the American Board of Psychiatry and Neurology, but for those desirous of additional training in the specialty. The teaching staff comprises a number of recognized specialists in this field throughout the state and is under the direction of Dr. Roy D. Halloran, superintendent, Metropolitan State Hospital, and Dr. Paul I. Yakovlev, clinical director, Walter E. Fernald State School.

NEW ENGLAND SOCIETY OF ANESTHESIOLOGY

The next regular meeting of the New England Society of Anesthesiology will be held in the White Auditorium of the Massachusetts General Hospital on Monday, October 7, at 8:00 p.m. Dr. C. H. Robson, of Toronto, Canada, will speak on the subject "Anesthesia for Children."

UNITED STATES CIVIL SERVICE EXAMINATIONS

Junior Medical Officer (rotating internship) $2000 a Year
Junior Medical Officer (psychiatric resident) $2000 a Year

Applications must be on file with the United States Civil Service Commission at Washington, D. C., not later than October 7.

For the rotating internship at St. Elizabeths Hospital, Washington, D. C., applicants must be fourth-year students in a Class-A medical school; however, they cannot enter on duty until they furnish a certificate showing completion of the medical course prior to June 30, 1941.

For the psychiatric resident position at St. Elizabeths Hospital, applicants must have completed their fourth year of study in a Class-A medical school subsequent to December 31, 1937, and must have the degree of B.M. or M.D. In addition, before entrance on duty they must have completed a one-year rotating internship.

Further information and the necessary forms may be obtained from the Secretary, Board of United States Civil Service Examiners, at any first-class or second-class post office, or from the United States Civil Service Commission, Washington, D. C.

SOCIETY MEETINGS AND CONFERENCES

Calendar of Boston District for the Week Beginning Sunday, September 29

Monday, September 30

*8:30 p.m. Diabetes and the General Practitioner. Dr. Reginald Fitz. Jewish Memorial Hospital, 45 Townsend Street, Roxbury.

Tuesday, October 1

*9–10 a.m. Differential Diagnosis of Certain Diseases of the Spine. Dr. J. D. Adams. Joseph H. Pratt Diagnostic Hospital.

Wednesday, October 2

*9–10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*12 m. Clinicopathological conference. Children's Hospital.

Thursday, October 3

*9–10 a.m. Cardiovascular clinic. Dr. John Homans. Joseph H. Pratt Diagnostic Hospital.

Friday, October 4

*9–10 a.m. Carcinoma of the Breast. Dr. E. M. Daland. Joseph H. Pratt Diagnostic Hospital.

Saturday, October 5

*9–10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*Open to the medical profession.

September 27, 28 — New England Surgical Society. Poland Spring, Maine.

October 1–4 — Forty-First Annual Meeting of the American Roentgen Ray Society. Page 478, issue of September 19.

October 6–11 — Annual meeting of the American Academy of Ophthalmology and Otolaryngology. Page 81, issue of July 11.

October 7 — New England Society of Anesthesiology. Notice above.

October 8 — Harvard Medical Society. Page 519.

October 8–11 — American Public Health Association. Page 655, issue of April 11.

October 9 — New England Dermatological Society. Page 390, issue of September 5.

October 9 — Four County Medical Society. Notice above.

October 10 — Pentucket Association of Physicians.

October 11, 12 — Pan-American Congress of Ophthalmology. Page 898, issue of May 23.

October 14–25 — 1940 Graduate Fortnight of the New York Academy of Medicine. Page 305, issue of August 22.

October 21 — American Board of Internal Medicine. Page 369, issue of February 29.

November 13, 14 — New England Postgraduate Assembly. Cambridge, Massachusetts.

December 27–29 — National Convention of the Association of Medical Students, Boston.

January 4, 1941 — American Board of Obstetrics and Gynecology. Page 1064, issue of June 20.

March 8 — American Board of Ophthalmology. Page 201, issue of August 1.

April 21–25 — American College of Physicians. Page 1065, issue of June 20.

June 2–6 — American Medical Association. Cleveland, Ohio.

District Medical Societies

SUFFOLK

November 7 — Censors' meeting. Page 305, issue of August 22.

WORCESTER

October 9 — Rutland State Sanatorium, Rutland.

November 13 — Grafton State Hospital, Grafton.

December 11 — St. Vincent Hospital, Worcester.

January 8, 1941 — Worcester City Hospital, Worcester.

February 12 — Worcester State Hospital, Worcester.

March 12 — Memorial Hospital, Worcester.

April 9 — Hahnemann Hospital, Worcester.

Supper will be served at 6:30 p.m. followed by a business meeting and scientific program.

BOOKS RECEIVED

The receipt of the following books is acknowledged, and this listing must be regarded as a sufficient return for the courtesy of the sender. Books that appear to be of particular interest will be reviewed as space permits. Additional information in regard to all listed books will be gladly furnished on request.

A Textbook of Medicine. By American authors. Edited by Russell L. Cecil, A.B., M.D., Sc.D., professor of clinical medicine, Cornell University Medical College, associate attending physician, New York and Bellevue hospitals, New York City; associate editor Foster Kennedy, M.D., F.R.S.E., professor of clinical neurology, Cornell University Medical College, attending physician, New York Hospital, visiting physician-in-charge, Neurological Service, Bellevue Hospital, consulting physician, New York Neurological Institute. Fifth edition, revised and entirely reset. 8°, cloth, 1744 pp., with 173 illustrations. Philadelphia and London: W. B. Saunders Company, 1940. $9.50.

Child Care and Training. By Marion L. Faegre, assistant professor of parent education, and John E. Anderson, director, Institute of Child Welfare, University of Minnesota. Fifth edition, revised. 8°, cloth, 320 pp., with 29 illustrations and 3 tables. Minneapolis: University of Minnesota Press, 1940. $2.50.

Heart Failure. By Arthur M. Fishberg, M.D., associate in medicine, Mount Sinai Hospital, New York City. Second edition, thoroughly revised. 8°, cloth, 829 pp., with 25 illustrations. Philadelphia: Lea & Febiger, 1940. $8.50.

Progress in Medicine: A critical review of the last hundred years. By Iago Galdston, M.D. With a foreword by Henry E. Sigerist, M.D. 8°, cloth, 361 pp. New York: Alfred A. Knopf, 1940. $3.00.

The Histamine and Insulin Treatment of Schizophrenia and Other Mental Diseases. By Horace Hill, M.R.C.P., medical superintendent, Laverstock House Mental Home, Salisbury, England. 12°, cloth, 133 pp. Baltimore: Williams & Wilkins Company, 1940. $1.75.

Physical Diagnosis. By Ralph H. Major, M.D., professor of medicine, University of Kansas. Second edition, revised. 8°, cloth, 464 pp., with 437 illustrations. Philadelphia and London: W. B. Saunders Company, 1940. $5.00.

Tuberculosis and Genius. By Lewis J. Moorman, M.D. 8°, cloth, 272 pp., with 10 portraits. Chicago: University of Chicago Press, 1940. $2.50.

Introduction to Medical Biometry and Statistics. By Raymond Pearl, A.B., Sc.D., Ph.D., LL.D., professor of biology, School of Hygiene and Public Health and Medical School, Johns Hopkins University. Third edition, revised and enlarged. 8°, cloth, with 121 illustrations and 140 tables. Philadelphia and London: W. B. Saunders Company, 1940. $7.00.

BOOK REVIEWS

Dermatologic Allergy. By Marion B. Sulzberger. 8°, cloth, 540 pp., with 39 illustrations, 13 colored plates and 17 tables. Springfield, Illinois: Charles C Thomas, 1940. $8.50.

Sulzberger has done an invaluable work in formulating this monograph on allergy. He presents a series of lectures on dermatologic allergy given to postgraduate students; these contain an unusual amount of valuable information. The author states it is neither a book of reference nor an encyclopedia on allergy, nor is it intended for the expert, but is merely a primer or introduction to dermatologic allergy for the purpose of instructing beginners in this field. He makes no pretense that this monograph will qualify students to diagnose and manage allergic skin diseases. It is given with the hope that something of practical value may help to stimulate further thought and encourage additional studies and investigations. However, if the reader masters the knowledge contained in this book, he will be thoroughly cognizant of all recent research in this field. It consists of fourteen lectures, an appendix which gives a list of the substances used in patch testing with the concentrations which are innocuous to normal skins, an outline of treatment for eczematous and urticarial dermatoses and a useful glossary of technical terms. Each lecture can be rapidly summarized by the marginal notes.

The first table is a schematic presentation of some of the important forms of allergic sensitivity. It groups certain phenomena according to the etiologic factor, and others according to the mechanism, a classification which he acknowledges is faulty. He remarks that his definition of allergy is a paraphrase or practically the translation of von Pirquet's original definition, and that the outstanding merit of the concepts of allergy lies in the demonstration of the closer relation of the phenomena of specific acquired increased sensitivity and those of specific acquired decreased sensitivity.

His definitions are clear and concise. He adheres faithfully to them, and his constant repetition of his concepts of allergic phenomena leaves no doubt in the mind of the reader as to just what he believes. After reading this book, the reader will find himself a willing or an unwilling disciple, because such constant repetition is bound to fix these definitions in his mind. While he may not agree with all the author's ideas, he will look in vain for errors and statements that are not supported by experimental work.

The section concerning the steps in establishing certain dermatoses on the basis of allergy should be read by all allergists as well as by dermatologists. The first step—the establishment of the dermatologic diagnosis—is most important and requires dermatologic training. As he states, one frequently sees a patient with a non-allergic disease put through numerous unnecessary skin tests. The second step postulates that there must be a history of exposure to substances which will fill the requirements of being possible allergens in the particular case. Such a history eliminates unnecessary testing.

Each lecture, dealing as it does with a particular phase of allergy and the investigation of the individual cases, is especially valuable in that it gives common-sense procedure in the study of cutaneous manifestations. The various types of skin tests are described and evaluated, and their advantages and disadvantages are clearly defined. The diagnosis of fungous diseases and the specific reactions to fungous extracts are discussed, so that the reader should obtain a working knowledge of the value of the latter in the diagnosis and treatment of these diseases. The chapter on drug eruptions emphasizes the role played by allergy in their production, describes recent research and lists the drugs known to cause dermatoses, the types of pathologic manifestations and the diagnosis and treatment. His comments expressed in footnotes are interesting and are based on his own experimental work, for which he deserves great credit.

What is true of this book is also true of other books on allergy; one wonders why there is so much ado about the concept of allergy. The condition was originally proposed to include those concepts not adequately expressed under the term "immunity." If it continues to stimulate its adherents to further research in the determination of the etiologic factor of disease, it should be accepted by all physicians, but if it leads off into bypaths of theoretical conjectures, it would be better to continue with the more ancient terms which are at least entrenched in medicine, perhaps for no better reason than established custom.

While the reviewer recommends that this book be read by dermatologists and practitioners of medicine in general, he especially recommends it to those specializing in allergy who have not had a dermatologic training.

Virus and Rickettsial Diseases, with Especial Consideration of Their Public Health Significance: A symposium held at the Harvard School of Public Health, June 12-17, 1939. 8°, cloth, 907 pp., with illustrations and tables. Cambridge: Harvard University Press, 1940. $6.50.

The purpose of the comprehensive symposium held at the Harvard School of Public Health in June, 1939, is succinctly stated in the preface of this volume, "To furnish an opportunity for the presentation and discussion of those problems of infectious disease in which virus agents are involved." "Publication," it is stated, "was undertaken because it was hoped that at the present state of virus investigation — a stage which we may regard as merely the beginning of an era in medicine which already equals in importance the most brilliant period of modern bacteriology — a contemporaneous survey might be found useful."

The growth of knowledge concerning both virus and rickettsial diseases during the past ten years has so outstripped the experience of the average health officer and of the practitioner interested in this field that such a summary is indispensable for the worker who attempts to maintain the vital line of communication between the basic sources of information and the rapidly widening fields of application. The investigator will look here chiefly for well-annotated statements of established facts and principles; the epidemiologist or health officer, on the other hand, will turn to it repeatedly as an encyclopedia which enables him to retain his perspective in the changing picture of communicable-disease control.

The limits of a book review preclude detailed discussion of particular subjects, but for the clinician the classification and consideration of the virus encephalitides offer a working approach, and the chapter on equine encephalomyelitis is a timely summary of our knowledge of a disease apparently new to the eastern seaboard of the United States.

The inclusion of rickettsial diseases in the symposium is pertinent because of their former confusion with virus diseases, because of their public-health significance and because of the recent notable additions to our knowledge of their epidemiology and immunology, especially in connection with typhus fever.

The inclusion of a chapter on distemper in animals may be criticized as not pertinent to a consideration of the virus diseases of man, but it should be remembered that the observation and study of a spontaneous infection in ferrets laid the foundation for practically all the recent advances in our knowledge of influenza. It is hard to see how the role of reporting in the control of measles has any specific bearing on its characteristics as a virus disease. Certainly the administrative questions which the author sets for himself involve no etiologic problems that are not equally pertinent to the control of whooping cough or scarlet fever.

Aside from its excellence as a compendium on virus diseases the volume is notable in being the work of the faculty and former students of a single university. Certain aspects of the subject, it is true, were consciously omitted, but as a result a large part of the material represents original work of the authors. Although intended for the general student and health officer, the book provides a comprehensive bibliography for the reader who wishes to penetrate more deeply into any of the various fields in which he is interested.

Good Health and Bad Medicine. Harold Aaron, M.D. 8°, cloth, 328 pp. New York: Robert M. McBride and Company, 1940. $3.00.

The modern conception of the most effective contribution to a general health campaign lies, first, in a well-educated medical profession and, second, in an informed citizenry who know what is true or false in the agencies employed in dealing with the prevention and treatment of illness.

The obstacles in the way of bringing about the adoption of the recommendations of those who see the advantages to the individual and the nation of sound minds in healthy bodies consist in the subversive propaganda for the endorsement of the cults on the one hand, and the commercial interest engaged in the distribution of worthless or dangerous drugs or appliances on the other.

Although Congress has enacted the Food, Drug and Cosmetic Act designed to protect the health and wealth of the people, this legislation is far from adequate, and the more effective correction of the situation lies in ability and inclination of the public to discriminate between the good and the harmful, advertised products.

The book is a valuable and supplementary contribution to the campaign carried on by organized medicine. Each chapter is a model of concise and well-arranged statements dealing with the disorders of the organs and systems of the human body. Especially valuable is the chapter devoted to emergencies, with directions about what to do before the doctor arrives when one has to deal with serious accidents or ingested poisons.

Physicians will find in this publication information and arguments which may be useful in combating ignorance and prejudice.

The New International Clinics. By George Morris Piersol, M.D. Vol. I, New Series 3. 8°, cloth, 319 pp., with 31 illustrations. Philadelphia: J. B. Lippincott Company, 1940. $3.00.

This volume is particularly broad in scope, embracing articles of great diversity. The subjects are far from stereotyped, as evidenced by "An Operation for the Cure of Certain Intractable Corns Between the Fourth and Fifth Toes," "Nail-Cracks in Diabetes," and clinics on "Probable Synergism of Human Influenza Virus and Staphylococcus Aureus in a Rapidly Fatal Respiratory Infection," "Precordial Migraine: An important form of 'angina innocens'" and "Relief of Pain in Cancer of the Tongue and Pharynx." An unusual feature of the book is the exceptionally large number of articles written with the joint efforts of two contributors. A long review on vitamins closes a volume of high standard.